# The RUBBER AGE

VOL. 25, No. 12 SEPTEMBER 25, 1929


# *Late News of the Rubber Indusrty*

### *United States Rubber Company Begins Bonuses as Profits Rise*

WITH net profit for the single month of August at approximately $800,000, an amount nearly 40 per cent in excess of earnings for the entire half year ended June 30, the United States Rubber Company has inaugurated plans for bonus awards to employes and for a managers shares trust. Although July earnings were comparatively small, the August showing is taken as an indication of a very satisfactory second half year, with the bulk of the company's large waterproof footwear business coming in the final quarter.

For the purpose of giving officers and employes added incentive toward increasing the earnings of the company, United States Rubber has evolved two profit-sharing plans which will be submitted to stockholders for approval at a special meeting October 15. These two plans consist of a bonus and a managers shares plan, combining features of the profit-sharing plans of the General Motors Corporation and E. I. du Pont de Nemours & Co.

The bonus plan is divided into three classes—A, B and C. Class A bonus awards may be granted for conspicuous service of any nature and will be granted irrespective of the earnings of the company, each case to be considered on its merits. Class B bonus awards may be granted to those who have contributed most in a general way to the success of the company by their ability, industry and loyalty. These awards are to be made from a fund to which the board of directors will credit annually such an amount as they may determine. This amount shall not exceed 10 per cent of the surplus net receipts (before interest on funded debt) over and above the following percentages earned on the capital employed: 5 per cent in 1929, 5½ per cent in 1930 and 6 per cent in 1931 and all subsequent years. In view of the fact that the company's average annual receipts on invested capital during the past eight years have been 3.88 per cent, it is apparent that employes will have to assist materially in increasing earnings before participating in profits.

Awards of both Class A and Class B bonuses may be made either in cash, in stock of the company, or in securities of any other company, or in both stock and cash, as directors may determine. Under this plan, directors may from time to time issue United States Rubber common stock not to exceed in the aggregate 150,000 shares in making awards under the plan.

The Class C bonus provides for awards to certain employes who equal or excel certain standards of performance which may be established from time to time, and which are not dependent upon the company's earnings. The Class C bonus may be combined or used in conjunction with the A and B bonuses. The entire bonus plan shall become effective for the year 1929.

The managers share plan involves the formation of a trust to which the company will issue 100,000 shares of its common stock, at $35 a share, receiving in return 100,000 trust shares of no-par value, representing ownership of all the assets to be held by the trust. The company agrees to pay to the trust in cash or in common stock an annual sum, beginning in 1930 and ending in 1939, equivalent to the sum credited to the Class B bonus fund outlined above.

The company may resell from time to time certain portions of the trust shares to employes of the company occupying responsible positions, price and terms of resale to be fixed by the finance committee. The trust shares held by the company shall not be entitled to dividends and shall be entitled to only $5 a share of the net assets of the trust. Upon crediting by the company to the trust amounts aggregating $3,000,000, and upon receipts by the company of an aggregate of $5 a share in cash for the 100,000 trust shares to be sold by the company, the 100,000 shares of common stock of the company shall be deemed fully paid.

### *U. S. Crude Rubber Consumption Was 38,274 Tons in August*

CONSUMPTION of crude rubber of all classes by manufacturers in the United States in the month of August is estimated at 38,274 long tons, according to statistics compiled by the Rubber Manufacturers' Association. This compares with an estimated consumption of 41,526 long tons for the month of July.

Total consumption of crude rubber by American manufacturers for the first eight months of this year is estimated at 349,108 long tons. Consumption during the first eight months of 1928 was 291,897 long tons.

These estimates are based on reports received by the association from manufacturers who are estimated to represent 90 per cent of the total consumption in the United States.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on August 31 at 90,769 long tons compared with 95,536 long tons as of July 31. Crude rubber afloat for the United States ports on August 31 is estimated at 41,619 long tons as against 38,859 long tons on July 31. These estimates are based on reports to the association which are believed to represent 95 per cent of the total for the United States.

## *Ajax Rubber Company Loss Is $504,920 in First Half Year*

REPORTS of the Ajax Rubber Company, Inc., and subsidiaries for the six months ended June 30, 1929, show a net loss, after interest, depreciation, etc., of $504,920, comparing with a net loss of $846,001 in the first half of 1928. Actual operating loss for the period amounted to $161,334, as against $276,651 in the first six months of last year. Interest, depreciation and other charges totaled $413,719, as compared with $354,874 a year ago, but in 1928 there was an additional write-off of $271,562 for crude rubber inventory losses.

The consolidated balance sheet of the company shows total assets as of June 30 of $13,878,192, as against the figure of $14,066,149 reported the year previous. The present statement, however, is higher than the figure of $12,361,187 reported as of December 31, 1928.

Of the total assets reported for the present year, land, buildings, machinery and other property accounts are represented by $5,019,072 and good will and patents at $2,184,875. Cash amounted to $586,307 as compared with $886,579 on December 31 and $944,842 on June 30, 1928. The value of inventories was figured at $3,453,522.

Of the company's liabilities, capital stock, represented by 880,330 no-par shares, was figured at $8,662,905 and mortgage bonds outstanding at $1,673,000. Notes payable are figured at $2,100,000 as compared with $400,000 a year ago. The other liabilities included promissory notes at $500,000, accounts payable at $744,984, and accrued liabilities at $197,303.

The consolidated income account for the first half of 1929 compares as follows with the like periods of the three preceding years:

| | 1929 | 1928 | 1927 | 1926 |
|---|---|---|---|---|
| Gross loss | $161,334 | $276,651 | $537,457 | *$587,535 |
| Other income | 70,133 | 57,086 | 97,890 | 78,108 |
| Loss | $91,201 | $219,565 | $439,567 | *$665,643 |
| Int., depr., etc. | 413,719 | 354,874 | 421,591 | 329,771 |
| Fed. taxes | ..... | ..... | ..... | 11,593 |
| Invent. adj. | ..... | †271,562 | ..... | 250,000 |
| Net loss | $504,920 | $846,001 | $861,158 | *$74,279 |

*Profit. †Price decline rebates and loss from write-down of inventories in excess of reserve provided.

## *Firestone Starts Addition To Factory Unit at Akron*

GROUND for a new $750,000 addition to the factory of the Firestone Tire & Rubber Company at Akron was broken on September 6. The new building, which will be seven stories in height, is to be used for expansion of the tire manufacturing departments and will add 3,500 tires to the Firestone daily production schedule.

The new structure will be built as part of the present plant No. 2. Addition of more than 2,000 men to the Firestone payroll is expected when the new department goes into production. The building will cost approximately $500,000 and the equipment $250,000.

Contract for the foundation has been awarded to the McArthur Concrete Pile Company, and the Burger Iron Company will erect the steel work. The contracts call for completion of the building shortly after the first of the year.

Firestone officials said the Akron expansion was decided on following approval by council of the paving of the old Northern Ohio Power & Light Company right-of-way, which runs south from S. Main street, past Firestone plant No. 2 and the new battery plant.

The Council has appropriated $73,000 for the city's share of this improvement, which will provide ready access to the Firestone property. The paving of this street is to be completed within 90 days. A portion of the street was paved several years ago by the Firestone Company at its own expense.

The Firestone expansion also is based on a promise from the city to give relief from traffic congestion on streets leading to the southern industrial district, by parking restrictions and street widening, Firestone officials said.

One step in the widening program has been taken by making plans for widening S. High street to 100 feet and building a 100-foot viaduct over the grade crossing at S. Main street.

## *Mohawk Rubber Company Has Profit of $283,945*

THE Mohawk Rubber Company has reported for the six months ended June 30, 1929, a profit of $283,945 after interest and depreciation, but before federal taxes. This compares with a profit of $296,464 in the first six months of 1928. The amount of net sales for the period has not been announced, but is believed to have been approximately the same as in the first half of 1928, when it totaled $3,098,447.

During the entire year of 1928, the Mohawk Rubber Company earned $766,040 and in the full year of 1927 showed a profit of $631,172. Although last year was unusual because of the upset in the crude rubber market, it is generally the case that the larger portion of the company's earnings come in the second half of the year. This is due to the fact that the company's sales are for the replacement market, rather than for the original equipment trade, and sales are heaviest in the summer touring season.

Mohawk Rubber capital stock at present consists of 21,643 shares of 7 per cent preferred and 114,344 no-par shares of common. The common stock was placed on a quarterly dividend basis of one per cent in stock and 75 cents in cash recently, and dividends on the preferred have been paid up to date.

After a refinancing plan was put in effect and a loan negotiated for $800,000 in March, 1928, the company's old common stock had a spectacular rise from 35 to a peak of 246, after which a stock dividend of 300 per cent was declared. The new common stock sold as high as 66 early this year, but has currently dropped to around 27. The preferred stock has declined from 90½ to 78. Both stocks are listed on the Cleveland Stock Exchange, and the common shares are also traded in on the Chicago Stock Exchange.

## *Hood Acquisition Increases Goodrich Assets By $30,000,000*

THAT the acquisition of the Hood Rubber Company and its subsidiaries has increased the total assets of the B. F. Goodrich Company by more than $30,000,000 is shown in a pro forma statement as of June 30, 1929, filed with the New York Stock Exchange by the latter company. This statement shows that Goodrich now has total assets of $168,418,008, as compared with the figure of $138,040,259, given in its previous statement for the same date. Surplus remains unchanged at $26,735,216, but current assets are given as $101,308,102 and current liabilities as $33,931,125, as compared with the previous state-

ment for Goodrich alone of $83,520,888 and $18,953,377, respectively.

Tentative pro forma balance sheet of B. F. Goodrich Co. after giving effect to the proposed acquisition of the assets and the retirement of the preferred stocks of the Hood Rubber Co. and its subsidiaries, as of June 30, 1929, follows:

Assets: Real estate, buildings and sundry equipment, less depreciation and obsolescence $59,268,297; cash $9,226,603; accounts and notes receivable $36,905,807; inventories $55,175,692; bonds with trustee $540,375; due from employes $383,979; preferred stock in treasury $854,600; securities of subsidiaries held for redemption $108,249; investments and advances to other companies $3,457,674; deferred charges $2,496,732; total $168,418,008.

Liabilities: 7% preferred stock $32,720,000; common stock represented by 1,053,638 no-par shares, less exclusion of intangible assets (namely, patents, trade-marks and goodwill amounting to $3,423,187), $57,798,001; funded debt $22,072,000; funded debt of subsidiaries $12,341,589; bills payable $117,67,500; bills payable of subsidiaries $8,912,221; accounts payable $10,998,377; sundry accrued liabilities $1,398,248; federal taxes $854,779; reserves $3,424,326; minority stockholders interest in subsidiaries $2,482,253; employes credit on subscription to common stock $288,312; surplus $26,735,216; total $168,418,008.

## *Rubber Footwear Exports Increase 45% During July*

HEAVY increases in the exports of rubber goods from the United States were indicated in the figures for the month of July, with gains in footwear shipments more than balancing the seasonal falling off in tire and other automotive exports. Shipments of all rubber manufactured products from this country in July amounted to $6,593,859, as compared with a total of $6,302,071 recorded in the month of June.

The most significant increase during July was an advance in value of $289,168 in rubber footwear exports which fully compensated the $231,112 decrease in automotive rubber goods exports. Mechanical rubber goods showed a value increase of $80,161, druggists' rubber sundries $23,968, rubber specialties $124,173, and partly manufactured goods $87,802. To offset partly these gains, declines were shown, besides the tire class, in rubber soles and heels to the extent of $16,362, proofed goods $64,785 and hard rubber goods $1,225.

July exports of rubber footwear increased 45 per cent in volume and 32 per cent in value. Exports of rubber boots aggregated 154,972 pairs, the largest in the history of our trade, shoes 214,216 pairs, and canvas rubber-soled shoes 974,514 pairs.

Of the rubber-boots exports, Denmark took 38 per cent of the total volume and the United Kingdom 36 per cent. The leading market for rubber shoes was Germany with 39,305 pairs, followed by Switzerland with 34,358 pairs. Other important markets were Norway, Italy, Brazil and the United Kingdom.

Argentina, formerly a good market for United States canvas rubber-soled shoes but more recently supplied principally by Canada, took 252,627 pairs from this country in July, or more than 50 per cent of its entire purchases from the United States in this class during the entire year 1928. The Philippine Islands, however, were in excess of Argentina, taking 253,388 pairs. Cuba was a poor third with 119,254 pairs. Other markets were insignificant in comparison.

## *Program of Rubber Division For Atlantic City Meeting*

MEMBERS of the Rubber Division of the American Chemical Society will assemble at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., on Thursday morning, September 26, for a three-day fall meeting. In addition to the regular business sessions, the elections of officers, and the reading of technical papers, a full program of entertainment has been arranged, including golf, tennis, bathing, a fishing trip and a complete schedule for ladies who attend.

**PROGRAM**

**Thursday, September 26**

8.30 A. M.—Registration.

9.30 A. M.—Vernon Room:

C. R. Johnson (Godfrey L. Cabot, Inc.)
*Carbon Black, II—The Role of Oxygen.*

A. A. Somerville, J. M. Ball and W. H. Cope (R. T. Vanderbilt Co.)
*The Aging of Vulcanized Rubber Under Varying Elongation.*

E. Karrer, J. M. Davis and E. O. Dieterich (B. F. Goodrich Co.)
*A Simplified Type of Goodrich Plastometer.*

E. O. Dieterich. (B. F. Goodrich Co.)
*A Method for Estimating the Extent of Penetration of Rubber Compounds into Fabric.*

Roscoe H. Gercke. (U. S. Rubber Co.)
*Thermodynamics of Stretching of Vulcanized Rubber.*

W. A. Gibbons. (U. S. Rubber Co.)
*Flexing Test for Tire Carcass.*

1:00 P. M.—Luncheon—Coral Room

Golf—As arranged at Hotel Desk.
Boardwalk—At your leisure.
Bathing—As you may choose.
Tennis—As arranged at Hotel Desk.

6:00 P. M.—Banquet, Rutland Room.

**Friday, September 27**

9:30 A. M.—Vernon Room:

V. N. Morris and J. N. Street. (Firestone Tire & Rubber Co.)
*The Effect of Temperature, Pressure and Humidity on the Permeability of Rubber to Air.*

F. J. Kilbourn, Jr. (Xylos Rubber Co.)
*Rate of Cure of Reclaimed Rubber, II.*

J. E. Skane. (Manhattan Rubber Mfg. Co.)
*Fabrics used in Rubber Belting.*

Report of Physical Testing Committee.
Business Meeting—Election of Officers.

1:00 P. M.—Luncheon, Coral Room.

2:00 P. M.—Time for Informal Discussions.

4:00 to 6:00 P. M.—Tea, Garden Room.

**Saturday, September 28**

9:00 A. M.—Fishing Party—Directed by W. H. Cope. (*Spiritus Bibendum Est*)

The program for ladies, under the direction of Mrs. S. M. Caldwell as chairlady, will include a rolling chair party, a trip to the Million Dollar Pier, and a theatre party to see Otis Skinner in "Hundred Years Old." In addition, there will be luncheons and teas on Thursday and Friday and a special dinner Thursday evening in the Green Room of the hotel.

## *U. S. Rubber Company Forms Fiber Products Department*

THE formation of a fiber products department by the United States Rubber Company has been announced by F. B. Davis, Jr., president. The new department will be responsible for the manufacture and sale of all unwoven fiber products containing rubber from natural or artificial latex and will handle the licensing of patents owned or controlled by the United States Rubber Company covering the manufacture of such products. It will also handle the sale of all natural and artificial latex to the paper and allied industries and will conduct the development of new products in its field.

R. P. ROSE

The newly created department will be under the general supervision of Ernest Hopkinson, vice-president, and with R. P. Rose as general manager. Mr. Rose has for four years been carrying on extensive experiments under the direction of Mr. Hopkinson with a view to developing commercial products employing latex in conjunction with unwoven fibers, such as paper, and to developing a market for them. This work has already made such satisfactory progress that it became necessary to create the new department to carry it along on a commercial scale.

Products of the new department will include mid-soles or doublers, innersoles, and other similar products used in the manufacture of leather shoes; Lexide, an imitation-leather base material used primarily for book bindings, luggage, trunk and bag linings, pocketbooks, card table tops, art leather novelties, advertising display cards, high grade catalogue and pamphlet cover paper, automobile decks and interior panel facings, and as material for radio dynamic speaker cones; Super-Lexide cutting blocks for clicker and beam type dinking presses used in cutting leather, plain and rubberized fabrics and uncured rubber compounds; and material for use in the cap visors of uniforms. Out of approximately 15,000 radio speaker cones made daily in this country, over 7,000 employ Lexide.

Sales offices will be established at New York, Chicago and Cleveland, and manufacturing will be carried on at the company's Lexide mill, Rock City Falls, N. Y., and at the fiber board mill, Cleveland, O. The latter mill is connected with the company's large Cleveland plant, but will operate as a unit of the fiber products department. The Lexide mill was recently acquired by lease and will be revamped to manufacture rubber treated fiber sheet material.

R. P. Rose, general manager of the new department, has been associated with the United States Rubber Company since 1919. After receiving his B.S. degree from Ohio University in 1912 and his master's degree from the University of Kansas a year later, he was a fellow of the Mellon Institute of Industrial Research until 1917, at which time he entered the Gas Defense Division of the Chemical Warfare Service with the rank of captain, being promoted to major by the time the war had ended. He worked in the general laboratories and on the plantations of the company until he turned his attention to development work on fiber products.

D. C. Cochran has been appointed sales manager of the department, Allen F. Owen general superintendent of the manufacturing division, and A. P. Delahunt manager of the control division.

---

## *Goodyear-Zeppelin Corporation Plans Pacific Dirigible Line*

ESTABLISHMENT of regular dirigible service between Los Angeles and Hawaii within the next few years seems to be a certainty, with Goodyear Tire & Rubber Company interests behind the project. Transatlantic airship service by the same group may be put into operation by 1933, according to newspaper reports.

Plans are said to be under way for the formation by the Goodyear-Zeppelin Corporation and Grayson M.-P. Murphy of a company which will be the forerunner of the trans-Pacific dirigible line which has been under discussion by Dr. Hugo Eckener and representatives of the banking house and the Goodyear organization early this month. The company will start with a small capitalization, but later will expand its scope to include the operation or ownership of a company which will provide periodic dirigible passenger, air mail and express service between Hawaii and Los Angeles.

Dr. Eckener, the commander of the *Graf Zeppelin*, and P. W. Litchfield, president of the Goodyear-Zeppelin Corporation, also met with representatives of the National City Bank, the banking house of Lehman Brothers, and the newly formed Lehman Corporation, an investment trust.

The directorate of the company is expected to include a number of the most prominent men in the aviation, banking and transportation fields and will be affiliated closely with such concerns as the Dollar and Matson Steamship Lines. The company will undoubtedly have a working agreement with one or more of the prominent transcontinental heavier-than-air transport companies now operating lines across the United States, which will make New York and Hawaii only four days apart by airplane-dirigible service. The airship service will, if successful, be extended to Japan at a later time.

The Goodyear-Zeppelin Corporation sent Commander J. C. Hunsaker, vice-president, to Honolulu last winter to look over the situation there and to make preliminary plans for the establishment of a dirigible base on the islands. The actual organization of the company to start the trans-Pacific line would be appreciably speeded up by government legislation to provide suitable air mail contracts. This would give the company some immediate earning power exclusive of any passenger transportation.

Newspaper reports, following the meetings of the dirigible and banking house representatives in New York and Akron, stated definitely that an operating company, with a capital of $15,000,000, would be formed to control the transatlantic service, with bases in France and this country. The American base, Dr. Eckener was quoted as saying, would be at Washington, D. C., or Richmond, Va., because of climatic conditions.

The dirigibles to be used in the California-Hawaii service will be built by the Goodyear-Zeppelin Corporation at Akron and will have a gas capacity of about 6,000,000 cubic feet, twice that of the *Graf Zeppelin*. They will cost approximately $5,000,000 each and will carry 75 passengers. The Luftschiffbau Zeppelin, the German dirigible company, which owns 25 per cent of the stock of the Goodyear-Zeppelin Corporation, will be connected with the plans through this ownership. In addition to Dr. Eckener, representatives of the German Zeppelin company who were present at the Akron conferences included Rudolph Pagenstecher, director; Fritz Von Meister, New York representative; and Dr. Karl Schmidt, legal adviser.

# *Why Not More* SPONGE RUBBER *Products?*

## A Plea for a Very Promising Undeveloped Phase of the Rubber Industry

*By* **R. R. OLIN**

*R. R. Olin Laboratories, Akron, O.*

THE purpose of this paper is to stimulate scientific investigation of methods of production of sponge rubber, with a view to putting its production on a sound basis. If this is done, there is a possibility of greatly extending the already wide use of rubber products.

### Possibilities of Application

There is considerable warrant for the belief that there is waiting to be developed a sufficiently wide range of uses for sponge rubber of various types, to involve within a comparatively short time, a production to equal or surpass in volume that now existing in the tire industry. For example, it is now being produced in a rather limited way, in some cases experimentally only, to insulate from:

1. Heat
2. Cold
3. Noise
4. Vibration, or shock.

A few possibilities under these headings are suggested:

1. Domestic refrigerators, refrigerator freight cars.
2. Residential and structural heat and cold insulation.
3. Talking picture studios, and aeroplane cabins.
4. Floor pads for dentists, bank tellers, etc.; also concrete pavement expansion joints.

Some other uses to which it has been put are: Toy balls, bath sponges, floor mats, automobile channel stripping, residential weather stripping, automobile upholstering, and chair cushions. In the form of blown hard rubber, it has been used for water valve floats, and in some cases to replace wood, where extreme lightness of weight is desirable, and where high strength and resistance to relatively high temperatures is not required.

The above is just an outline of some of the established and possible uses for sponge rubber. To the wide awake manufacturer, numberless other applications will occur.

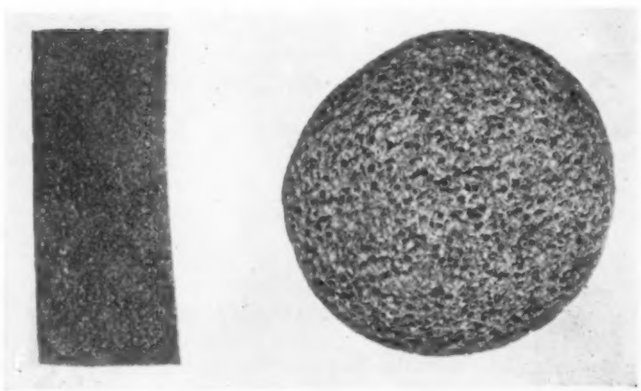
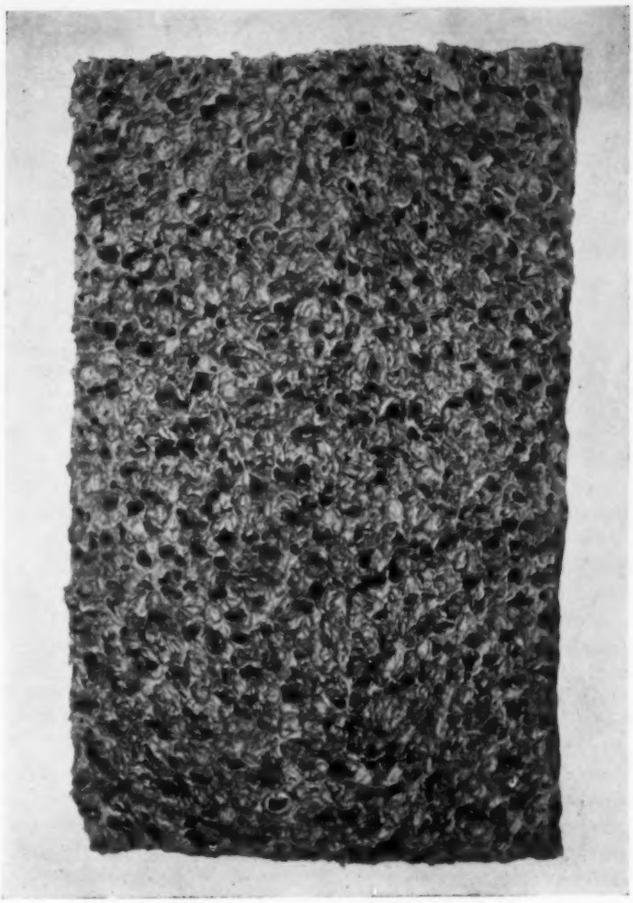


*Photo by courtesy of Sun Rubber Co., Barberton, O.*

**Type 1**
**Small Pore**

**Type 2**
**Medium Pore**



**Type 3**
**Large Pore Known as "Featheredge"**

### Present State of Scientific Development

At the present time, the manufacture of sponge rubber products is in about the position that the rubber industry as a whole was in, say along 1905, just before the advent of the rubber chemist and organic accelerators. In a nutshell, sponge rubber manufacture today is an art rather than a science. For this reason, the volume of business is comparatively small, and limited to a relatively few companies. A glance through the index to rubber literature for the past twenty-five years will substantiate these facts.

It is a matter of considerable interest to note that the British are ahead of America in appreciating the possibilities for profit in this phase of the industry. This is evidenced by the recent publication of two articles in one British magazine, devoted to the interests of their rubber industry. These two articles were the reports of results

of investigations on sponge rubber, which were sponsored by the British Rubber Growers' Association, and the British Manufacturers' Association, respectively.

### Types of Sponge Rubber in United States

So far as the writer's knowledge goes, so called "cellular rubber" is not manufactured in this country. For this reason, it will not be considered here. There are three types of sponge rubber produced here, all of which are shown in the accompanying illustrations:

1. Small pore.
2. Medium pore.
3. Large pore—known as "Featheredge."

The small pore type is usually manufactured in molds or frames in presses only. On the other hand, types 2 and 3 may be molded in presses, or vulcanized in frames in flat sheets in open steam. At present, press cured articles as a rule, are limited to relatively thin articles, while open steam cured goods may be produced in thicknesses up to four inches.

### Sponging Materials

Sodium bicarbonate is the material generally used to produce small pore sponge. The chemical text books indicate that this material gives off carbon dioxide gas when heated to 498 degrees Fahrenheit. This, of course, is much above temperatures used for vulcanizing. It appears therefore, that the natural organic acids present in rubber, must decompose the soda at temperatures about that used for vulcanizing. As is well known, the natural acid content of rubber varies considerably among various lots of even high grade rubber. As a consequence, considerable variation in sponging of the rubber results. The recourse of the practical factory man in such an event is to blend batches that are found to be variable. This, of course, is a wasteful and expensive method, as this blending is not performed until after one or two heats have been cured out of a batch that is not acting properly. This results in excessive scrap and production loss. The addition of small amounts of some of the organic acids used in general rubber manufacture helps to a certain extent to overcome this variability. However, the use of stearic or oleic acids introduces some other difficulties that are about equally serious.

Due to the fact that sponge rubber containing soda, vulcanizes and sponges practically simultaneously, small pores and comparatively heavy sponge rubber is produced. It also naturally follows that vulcanization is effected at relatively high temperatures, which, of course, is not conducive to good ageing.

The addition of relatively large amounts of organic acids reduces the temperatures of decomposition of soda, and so permits the manufacture of medium pore and somewhat lighter sponge. This, however, is not considered good practice, because, as stated above, these acids introduce some other difficulties that are rather serious.

Powdered ammonium bicarbonate is the material generally used for producing large pore sponge. According to the chemical text books, this material gives off carbon dioxide and ammonia gas when heated to 140 degrees Fahrenheit. As a matter of fact, it gives off both gases at ordinary temperatures. It will be readily appreciated that it is very difficult to control sponging conditions uniform, with a material of this sort that gives up its gas during milling, tubing, and calendering operations. It is, of course, due to this fact, that it blows the rubber before vulcanization starts, that it is possible with it to produce large pore sponge. Blending of variable batches is also necessary with this type of compounds, due to variable losses of blowing material. It seems almost unnecessary to note that this type of sponge must be processed at as low a temperature as possible. This method, of course, produces relatively light weight sponge, known in the trade as "featheredge."

Medium pored sponge is produced as indicated above, with soda and organic acids. Mixtures of soda and ammonium carbonate are also used.

Water is used for producing some sponge rubber. While it has some advantages, it is not a desirable material from the production standpoint. As is well known, it expands into steam at 212 degrees Fahrenheit, which is sufficiently high to avoid serious loss during processing, and at the same time, far enough below vulcanizing temperatures to permit of satisfactory expansion before vulcanization starts. On the other hand, it is necessary with it to blow rubber to rather high pressures at vulcanization temperatures and then cool before removal from molds to prevent collapsing. This slows down production very materially.

Mixtures of chemicals that produce nitrogen gas, such as ammonium chloride, and sodium nitrite, are also used to a limited extent. These mixtures are rather unstable, and therefore not very satisfactory.

### Plasticising

It will be readily appreciated, that to get uniform and maximum blowing effect, the rubber must be thoroughly and uniformly plasticised. It is also highly desirable that this plasticising be maximum in unvulcanized rubber, with a minimum noticeable effect on the vulcanized product. To accomplish plasticising, early sponge rubber manufacturers used large quantities of all sorts of softeners. This almost invariably produced "soggy" products, and frequently resulted disastrously as regards ageing. One type of softener very widely used is factice. This material produces fairly satisfactory goods. However, probably due to its effect in retarding cures, it tends to cause collapsing.

The method that produces the most satisfactory results is to "grind" the rubber on *cold tight* mills, in very small lots. The usual practice is to grind 10 to 20 pounds for relatively long times on a 40 to 42 inch mill. This is a very expensive process. The cost of this operation ranges from 3c to 6c per pound of finished compound, depending on local power and labor costs. Furthermore, due to minor variations in the setting of the mill rolls and the temperatures attained during grinding, this method results in variable plasticity. Here again, the practical factory man's recourse to correct this condition is blending of variable batches. As intimated earlier in this paper, a solution of this problem must be found before manufacturers can hope to realize the potential profits to be derived from the production of articles in large volume to which sponge rubber is ideally adaptable.

### Compounding and Mixing

As a rule, the usual compounding ingredients in general use may be employed. Naturally, materials like carbon black, which tend to stiffen unvulcanized rubber, are to be avoided as far as possible. Also, due to the relatively large surface, compared to the volume of rubber in sponge rubber articles, exposed to the action of the air, it is highly essential to use only materials, and combinations of materials that are known to produce good ageing results. For this reason, antioxidants are practically indispensable.

In general, from the above consideration of the reactions of the blowing materials, it is highly desirable that the so-called "delayed action" accelerators be employed. There are several rather delicate problems to be solved in this connection. First, it is desirable that the rubber expand completely to the size of the desired finished article before vulcanization starts to take place. On the other hand, to avoid surface "blow holes" it is desirable that the outside "skin" vulcanize rather rapidly. Then when ex-

*(Concluded on page 673)*

# Sponge Rubber Compounding

## An Analysis of the Present Accepted Practices—Pale Crepe Crude Has Been Found Most Satisfactory as Basic Material—Ageing Is a Major Problem in Sponge Rubber Problems

SPONGE rubber compounding has probably been the least discussed and the most inaccessible branch of rubber technology, partly due to the fact that until recently the field has been very specialized and confined to a few products, many of which have been manufactured in Europe. Within the past few years, however, the field for rubber sponge products has widened considerably, and the rubber chemists have done considerable work in ferreting out the compounding difficulties. Among the new uses for sponge rubber might be mentioned channel rubber for automobile window stripping, bath mats, chair cushions, stamp pads, toys and novelties, and heel cushions for athletic footwear.

Rubber of uniform plasticity is very essential for sponge compounds. Wild rubbers have been discarded on account of their lack of uniformity. Pale crepe has been found the most satisfactory grade because it loses its nerve on milling more quickly than smoked sheets. Roll brown and the ambers are often mixed with it to insure a soft compound.

Natural ground whiting is the best all round filler for sponge rubber. Zince oxide is used only in quantities sufficient to activate accelerators. Lithopone is used whenever it is desired to produce a white sponge or light pastel shades. Carbon black is occasionally used for producing sponge rubber stocks having high abrasion resistance and high tensile strength, but only in small quantities for coloring purposes because of its stiffening effect.

### *Softeners Important in Compounding*

Stearic and oleic acid are valuable softeners for use in sponge rubber, not only because of their plasticizing action, but also because they assist in the liberation of carbon dioxide from such blowing agents as sodium bicarbonate. From five to ten per cent of these fatty acids, based on the weight of the rubber, is usually required. In case an additional softener is necessary, petrolatum is quite often used. Palm oil is a good softener except that it has a noticeable odor and darkens the cured stock. Parrafin gives good results but the surface bloom is often objectionable. It assists in producing a stiffer stock than petrolatum. Rosin and burgundy pitch are used when it is desired to increase the tackiness of the uncured stock; the quantity of the rosin should be limited on account of its adverse effect on the ageing properties of the finished article. White substitute is not recommended as it reduces the sponging and ageing qualities of the compound. Brown substitute is sometimes used in cases where a large quantity of softener is desirable and also to assist in calendering and slabbing out the stock free from cold checks or mill marks.

Sodium bicarbonate has been found to be the best blowing agent for general use. It is stable and can be obtained quite uniform as to purity and fineness. It should be free from lumps or large particles as they tend to produce a cured article with an uneven cell. Ammonium carbonate and ammonium bicarbonate are also used to a large extent. Ammonium bicarbonate is the better of the two because its vapor pressure is lower and stocks containing it can be stored for a longer period of time without deterioration. Ammonium carbonate and ammonium bicarbonate produce a larger cell than sodium bicarbonate.

The only accelerators that can be satisfactorily used in sponge rubber are those that have a slow rate of initial setup, so that the sponge may be fully blown before it begins to cure. The guanidines are sometimes used, but the modern demand for a quick cure has caused the adoption of quicker action accelerators.

Sponge rubber products are ordinarily poor agers because of the large area of exposed surface and the large percentage of softeners in the compounds. Anti-oxidants are therefore widely used in these compounds.

### *Require More Milling Than Usual*

Sponge rubber compounds require more uniform milling than any other type of stock. The setting of the mill and the roll temperature have a great influence on the blowing of the compound. It is recommended that rubber for sponge work be carefully blended to insure uniformity and, except when a small cell is required, the rubber should be pre-masticated. The best results are obtained by breaking down the rubber on a tight, cold mill, sheeting it off about $^{1}/_{16}$" thick. The more thoroughly the rubber is broken down, the larger the cell will be in the finished product. More thorough breaking down is necessary for the production of thick slabs of sponge rubber than for thin ones. When a large cell is required, it is best to allow the softeners to be milled into the rubber completely before adding the pigments. For producing a medium-sized cell the softeners may often be added along with the pigments.

Sponge stock should be aged after milling for not less than 18 hours in order to insure uniform blowing. It may then be slabbed off, calendered or tubed, depending upon the article to be manufactured. The best method to follow is to determine the size and weight of an uncured slab that will give a satisfactory finished article. The stock should then be run to this weight rather than any certain gauge as the gauging of such soft stock is very unreliable. In the case of slabs, the gauge of the stock should be uniform all the way across the slab as thick spots would tend to cause

*The above article is based, in general, on data contained in the circular of the Rubber Chemicals Section, E. I. DuPont De Neumours & Co., Inc., Dyestuffs Department, Laboratory Report No. 129A, dated July 25, 1929. Typical formulae, as published in the report, are omitted.

the slabs to stick to the fabric covering the presses, making it impossible to remove the cured slab without tearing the fabric. Moulded goods should be cut so that the contour of the uncured stock is practically the same as that of the finished article. This allows the blow to take place normally and the stock does not have to flow excessively in order to fill out the mould. The prepared stock should be dusted with soapstone or starch. The latter is a less efficient lubricant than soapstone, but gives the finished article a cleaner surface.

Slabs are usually cured in a press having the platens covered with a fine count sheeting, which should be dusted prior to each cure. Slabs are usually cured in irons in preference to frames. The slabs are placed between the platens and the irons moved up to the edge of the slab. It is advisable to use low hydraulic pressure on the presses to prevent the irons from cutting into the fabric; usually 60 to 70 pounds pressure is sufficient.

Aluminum moulds are preferred for large moulded articles, due to the high heat conductivity of the metal. Steel or iron moulds are satisfactory for small articles. The mould should be well vented so that no resistance is offered to the blowing of the stock. Both the mould and the stock should be dusted in order to avoid pocketing air between the stock and the mould. In developing a new article the exact weight should be recorded and the uncured blanks should always be cut out to exactly the same weight, as a slight variation will produce an article which either shrinks after cure or is not entirely filled out.

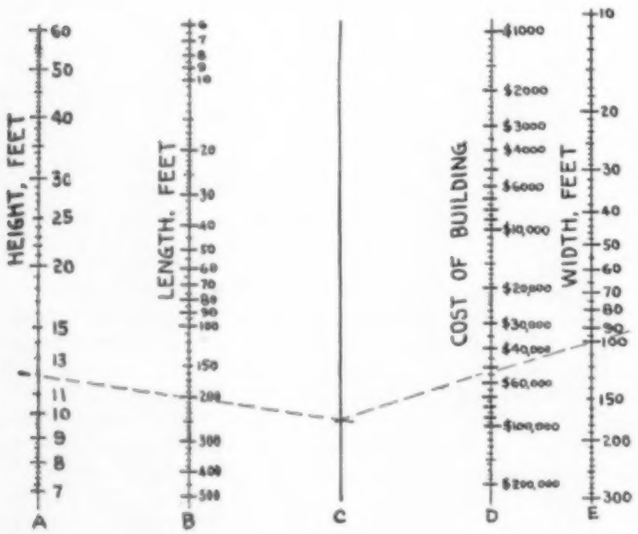
When sodium bicarbonate is used as a blowing agent, the curing pressure should be between 40 and 60 pounds per square inch. Higher steam pressures cause surface overcures and often result in excessive shrinkage on cooling. Overloading the mold or frame also causes excessive shrinkage. Steam pressures of less than 40 pounds per square inch are not practical when sodium bicarbonate is used, because slow blowing results under these conditions. Sponge rubber compounds should be cured until there is no tackiness or sticking together of the cells when the article is compressed. This tackiness must not be confused with the stock momentarily holding a distorted shape due to the slow passage of air through the skin of the sponge.

# *Schaphorst's* CHATS *with the* ENGINEER

*By* W. F. SCHAPHORST, M.E.

## *How Much Does a Modern Rubber Factory Cost?*

YOU and I have frequently heard the question, "About how much is a rubber factory worth these days?" Costs vary from year to year. Here is a chart which I recently prepared and which will be found useful for answering such questions as the above.




Simply zigzag two straight lines across as indicated by the dotted lines and the answer is instantly found in Column D.

For example, if the height of the factory is to be 12 feet, find that height in Column A. If the length is to be 200 feet, find that length in Column B. Then run a straight line through the 12, Column A, and the 200, Column B, and locate the intersection in Column C. Then from the located point in Column C run over to the width, Column E. Thus, if the width is to be 100 feet, the intersection of the line with Column D gives the answer as about $53,000. As will be noted, the limitations of this chart are very great, Column A varying from 7 to 60 feet in height. The length, Column B, varies from 6 feet to 500 feet and the width, Column E, varies from 10 feet to 300 feet. The costs included vary all the way from $1,000 to $200,000.

In developing the chart it was assumed that reinforced concrete would be used with flat slab ceilings and without beams or girders. The construction permits uninterrupted distribution of light and low cost installations of sprinkler equipment, shafting, and the like. Usually ceilings are about 12 feet high and columns about 20 feet apart. A factory 60 feet high is unusual, of course. Floors are generally designed to sustain a working load of 125 pounds per square foot and are finished with cement.

It is also assumed that factory-type steel windows will be used. These, with ventilating units, will fill about 50 per cent of the wall area. This sort of construction insures plenty of daylight and air. Inside walls are usually cold water painted. If particularly good illumination is wanted, oil paint is generally used instead of cold water. The average for artificial illumination is one watt per square foot of floor space. A steam heating plant is also provided for in the basement with wall-type radiators, located beneath the windows. These are designed to maintain a temperature of 70 degrees F. inside the building during zero weather. For sprinkler equipment it is common to allow one head for each 90 square feet of floor area. The plumbing varies with the number of employes and with state and municipal requirements. Partitions generally are of hollow tile, 4 to 6 inches thick.

Regarding elevator equipment, our best construction engineers generally allow one 3,000-pound capacity car for each 100 by 100 feet building. Two cars are allowed for a 100 by 200 feet building. The first floor is usually about 4 feet above the ground. This makes it easy to unload from box cars which are about 4 feet 2 inches above the rail tops. Also this makes it easy to load trucks which are usually about 3 feet 8 inches above the surface of the ground. Permanent provision is also allowed for protecting trucks and cars during the loading process in the event of rain or snow.

In other words, this chart covers the cost of a first class building. It is based on experience with the construction of hundreds of modern factory buildings.

*No. 3 of a Series of Articles on the*

# Uses of RUBBER in Modern Aircraft

## Rubber in Aircraft Power Plant and Radio Installations

*By* JOHN F. HARDECKER

*Chief Draftsman, U. S. Navy Aircraft Factory, Philadelphia, Pa.*

RUBBER, considering the nature of an airplane power plant, has a surprising number of uses in such a power plant. A few of these uses follow accepted commercial practice in their rubber requirements, but in most cases these requirements are highly technical and special in nature. The general uses will first be described, followed by more specific descriptions where demand and usage warrant such detail.

Both high and low tension ignition cable are used in the power plant circuits. While high tension cable was formerly plain rubber insulated, both high and low tension cable now use a protective lacquered braid over the rubber insulation. The low tension cable is also used for electric circuits for lights, flares, gun controls, etc. Splices in cables are protected by rubber electrician's tape.

Rubber safety nipples are used extensively to cover the junction of ignition cable and the terminal ends of spark plugs. These safety nipples protect from water and shock. Rubber packing is used on all air cooled engines between the fuel inlet pipe and the crankcase. Hard rubber radiator caps are used on airplane radiators. Rubber grommets of various sizes and shapes are used in many places where wires, tachometer shafts, etc., run through solid metal walls. Recent aeronautical standardization has accepted the Society of Automotive Engineers' Standards for these grommets.

### Airplane Gasoline Hose

For aeronautical use, the gasoline hose must be a high grade hose with a gasoline resisting tube, a minimum number of light plies of fabric and a thick tough rubber cover. When used as a flexible connection in the fuel or oil line, the rubber cover must not flake off nor the hose swell and break the connections. Clogged feed lines have been responsible for many flight failures. In some instances the inner tube of gasoline hose has flaked due to the action of gasoline on the rubber. The hose must therefore be constructed to obviate this possibility.

Reference is made to the Army & Navy Master Specification for gasoline hose for the detail requirements quoted. The inner and outer cover shall be made from a compound containing not less than 25 per cent washed and dried Upriver Fine Para rubber, or its equivalent in high grade plantation rubber. The remainder of the compound shall consist of suitable fillers which shall be free from all substances which might injuriously affect the quality of the compound. No filler shall be used which is originally soluble in gasoline or oil, or which would tend to deposit or cause corrosion in the gasoline line or which would form decomposition products during vulcanization and cause any of these defects. The rubber shall not contain more than 1.5 per cent of free sulphur. The fabric shall be a cotton canvas of good quality Upland or Peeler cotton, or equivalent, with a minimum weight of 8 ounces per square yard.

The component parts of the hose shall be an inner rubber tube, not less than two plies of frictioned rubber fabric, and an outer rubber cover. The rubber compound shall be properly vulcanized and the inner tube shall be seamless. The thickness of the wall of the inner tube shall not be less than 1/16 inch, and of the outer cover not less than 3/64 inch. For 1 inch or less internal diameter of hose the total wall thickness shall be 5/32 inch, (2 ply), from 1 1/16 to 2 inches it shall be 3/16 inch, (3 ply), larger than 2 inches it shall be 7/32 inches (4 ply). The tests required include the hydraulic test, friction test, physical tests, gasoline immersion test, etc., and are far too involved to be quoted here.

### Airplane Radiator Hose

Airplane radiator hose must be made of specially compounded rubber and light strong fabric. The tube upon which it is built should be able to withstand the action of

NOTE: *The first of this series of articles appeared in* THE RUBBER AGE *of August 10th. The next and concluding article will be published in the issue of October 10th.*

hot, oily water. It should be built for hard service in order to keep forced landings down to a minimum.

The Master Army-Navy Standard Specification for aircraft radiator hose contains the following detail. The fabric shall be cotton canvas of good quality Upland or Peeler cotton, weighing 12 ounces per running yard of 40 inches wide. The inner tube and outer rubber cover shall be made from a compound containing not less than 25 per cent of new wild or plantation rubber, and not more than 1.5 per cent of free sulphur nor more than 3 per cent of total sulphur. The remaining portion of the compound shall consist of suitable dry inorganic fillers, and 2 per cent of a softening compound such as waxy hydrocarbon may be added. The mineral fillers shall be free of all injurious substances.

The thickness of the wall and the number of plys of fabric shall vary for the various diameters as in gasoline hose. The tensile strength of the tube and of the cover shall not be less than 800 and 600 pounds per square inch, respectively. The minimum elongation of a 2 inch section at the breaking point shall be not less than 350 per cent. A three foot length of hose shall not leak, rupture, sweat or show any signs of failure when subjected to internal water pressure for 10 minutes of 100 pounds per square inch for diameters up to 2 inches, and 75 pounds per square inch for diameters over 2 inches. The plies shall be cemented together with a coating of rubber compound so that the force required to separate the plies of fabric of a 1 inch section of hose at the rate of one inch per minute shall be not less than 12 pounds. The inner and outer rubber cover shall be securely vulcanized to the fabric. The force required to separate the tube from the fabric of a 1 inch section of hose at the rate of 1 inch per minute shall be not less than 10 pounds.

### Rubber Mountings for Airplane Motors

In view of the substantial progress made in insulating automobile motors with rubber, it is evident that the same principle may be applied to airplane motors. Rubber reduces both vibration and noise which is transmitted from the motor to the structure of the ship. While the molded

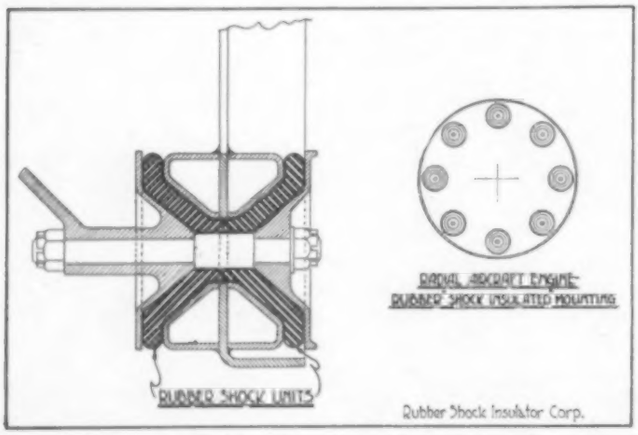


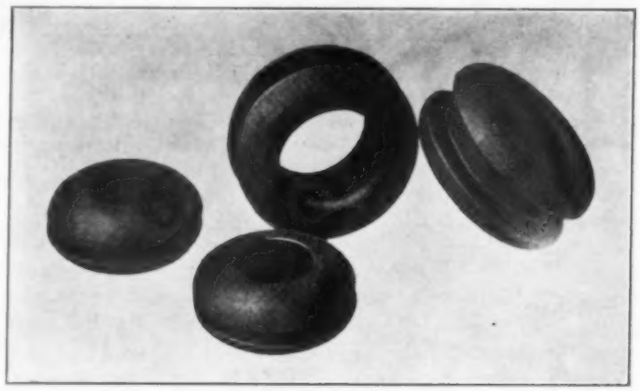

**Diagram of Rubber Shock Insulated Mountings**

rubber insulated motor mounting is still in the early stages of development, it appears highly probable that the close cooperation always existant between the rubber and aircraft industries will produce practical results which will insure that this will be the accepted method of engine mounting in the not too distant future.

### Rubber Covered Tanks

There have been many attempts made to develop a fuel tank that will withstand machine gun fire and crashes without the leakage of its contents. This is particularly significant from a military viewpoint, in that 75% of military fatalities in time of war may be traced to pierced fuel tanks. In the various solutions that have been developed as an answer to the problem, rubber plays the most important part.

The rubber cover is particularly adaptable as a solution because of its inherent properties. A bullet entering a fuel tank makes an aperture of the diameter of the bullet itself. In emerging, however, a much larger hole is torn in the metal. While the momentum of the bullet is arrested by the liquid, the pressure built up in the liquid itself is the main cause of the hole torn at the exit. The



**Grommets *(U. S. Rubber Co.)***

principle used in most solutions of the problem is to allow the energy of the pressure wave to dissipate by providing the tank with a resilient outer covering, so that when the pressure exceeds a certain point, the tank yields and the rubber stretches out from the side of the tank under pressure. Naturally, the highest point of the stretched rubber covering is that through which the bullet makes its exit, and the rubber being stretched makes this point also the thinnest portion of the covering, so that when the bullet leaves, and the pressure is relieved, the rubber goes back to its former shape and completely closes up and scales the bullet hole. This same rubber covering would also be of value in restraining the fuel in commercial crashes, eliminating to a great extent the fire hazard.

The rubber used in these crash proof tanks is very special, approximating from ¼ to ½ inch in thickness. In some instances it is a single thickness of rubber vulcanized in place, in others it is a combination of fabric with different plies of rubber compound. The development of rubber covered tanks is still in the experimental stage, and has not as yet been adopted as standard installations for commercial planes.

### Airplane Storage Batteries

Rubber is used for the battery boxes and covers of all storage batteries used in aircraft. These batteries have a multiplicity of uses among which may be mentioned instrument and cabin lighting, landing and navigating lights, electric heated suits for open cockpit planes, power for sending and receiving in radio, and in place of magnetos on special airplane engine installations.

The Army-Navy Standard Specification states that the battery jars shall be made of hard rubber or an improved rubber composition free from all granular matter and metallic particles such as copper, brass, tin and iron, aggregations of which have not been thoroughly incorporated into the rubber compound. The rubber must be free of any and all material dissoluble in sulphuric acid solutions of 1.4 specific gravity. The surface of the jars inside and out must have a smooth finish free from pitting, blowholes, rough spots, rubber scales, blisters or other deformations.

Tests on the jar material at 70-80 degrees Fahrenheit,

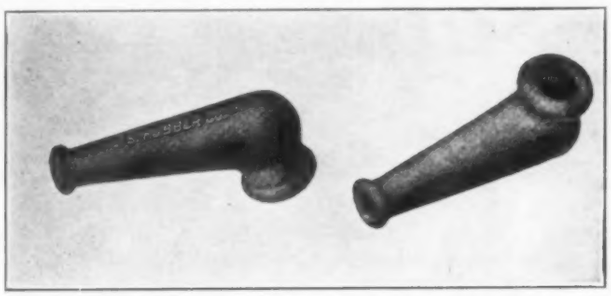
must show a product of the tensile strength and elongation of 30,000 between limits of 4,000 and 6,000 pounds per square inch tensile and 7½ to 5 per cent elongation. Samples which show an elongation in excess of 7½ per cent must have a tensile strength of not less than 4,000 pounds per square inch. Samples showing a tensile strength in excess of 6,000 pounds per square inch must show an elongation of at least 5 per cent. An electric high potential test is also used to detect flaws such as metallic veins or invisible cracks.

All cell covers must be of hard rubber and must exceed a tensile strength of 2400 pounds per square inch with an elongation not less than 4 per cent. The separators may be made of threaded rubber, slotted rubber and wood or other combinations.

### Rubber in Aircraft Radio Installations

Rubber finds a multiplicity of uses in airplane radio installations. Sponge rubber is used for earpads in radio helmets and also for radio tube supports. The latter use is essential due to the vibration in an airplane, which makes it necessary to obviate the vibrating of tube elements which would cause a hum or ring sound in the head phones. Hard rubber is used for insulating work, especially on high frequencies. Rubber exercising cord is used to suspend radio sets to protect against vibration. It is particularly useful on receivers and small size transmitters.

Low tension lacquered braid rubber insulated cable is used in connecting field circuits of generators, low tension



**Safety Nipples** ***(U. S. Rubber Co.)***

filament lighting circuits of generators, etc. and for oil battery leads for receiving sets. A special high tension soft rubber covered cable is used for leads to the antenna system and in certain instances for internal wiring of circuits.

### Special High Tension Soft Rubber Covered Cable

This special aircraft radio cable must have a rubber insulation which is homogeneous in character, tough, elastic and adhering to and placed concentrically around the conductor. The cable is insulated to a diameter of 5/8 inch, using 3 layers of rubber all of which must adhere closely to each other and show a smooth surface and perfect workmanship. The 3 layers of rubber are of different colors and quality as follows:

(1) The first rubber coating approximates .200 inches in diameter. This compound must contain not less than 50% by weight of pure Up-River fine dry Para rubber, first latex crepe or selected smoked sheets.

(2) The second coating is a coat of white rubber to a diameter of approximately .400 inches. This rubber must vulcanize white and contain not less than 30% by weight of pure Up-River fine dry Para rubber, first latex crepe or selected smoked sheet.

(3) The outer jacket is to form to approximately .625 inches diameter. This compound must not contain less than 30% by weight of pure

**Chafing Discs** ***(Dural Rubber Co.)***

Up-River fine dry Para rubber, first latex crepe, or selected smoked sheets.

The compound is applied in a close fitting mold or continuous lead sheaths. After vulcanizing the jacket must be a firmly bound, strong, highly elastic, homogeneous mass. It must remain soft and flexible under continuous vibration or frequent bending when used under intermittent or continuous high temperature (75° C.).

The rubber compound must undergo a stretch test, and the tensile strength of the exterior rubber jacket must be not less than 1000 pounds per square inch. In addition, certain chemical and electrical tests must also be met, the chief one being an insulation resistance while immersed in water of not less than 1000 megohms per mile at 60° F.

### Miscellaneous Uses of Rubber

Rubber, in addition to the uses mentioned in detail in these articles has such a great number of miscellaneous uses, which for want of space, will merely be mentioned in passing. Sheet rubber is used for making water tight access doors in the bulkheads of flying boat hulls, for windshield wipers and for buffers and chafing strips. Moulded rubber is used for telescopic sight mounts, gun camera mounts and in fact for all special equipment where vibration must be eliminated. Rubber spacers or chafing discs are used at wire intersections to prevent the wires from flapping and chafing in the wind.

Rubberized cloth is used for open cockpit covers, and for flotation bags on land planes with an emergency flotation gear which is inflated by air in case of a forced landing on water. Rubber paints have been used for experimental airplane finishes. Stranded rubber exercising cord has been used for bunges or Sandow cord in equalizing rudder and elevator pull.

---

## "U. S." Downcomer Rubber Pipe

AFTER tests ranging back to 1927, the United States Rubber Company has now introduced on the market the "U.S." Pilot Downcomer rubber pipe. The pipe is designed for power plants which are equipped with automatic stokers using coal or coke for fuel. Its primary function is to overcome the objectionable features present where metal chutes or pipes are used, and in which case the abrasive action of the coal and coke shorten their life.

In the case of plants using coke breeze and bituminous coal, in addition to the abrasive action, there is a corrosive action caused by sulfuric acid. The Pilot Downcomer rubber pipe is said to also meet this problem. It is stated that the service to which this pipe has been applied up to the present has shown a creditable saving.

The Pilot Downcomer rubber pipe has an inner tube of abrasive resisting rubber ¼-inch thick, in conjunction with heavy duck suitably reinforced with wire. The flexibility of the pipe makes it possible, in the installation, to take care of any small inaccuracies in alignment between the bunker opening and the stoker hopper. Another advantage of the rubber pipe over that of metal is that it permits turning the pipe one-eighth or one-quarter turn as wear may appear in any one place.

The Pilot Downcomer rubber pipe is being furnished in various sizes, from 4 to 24 inches, and in length from 10 to 50 feet.

# Financial Position *of the* Industry

## A Comparative Chart Showing the Capital Structure, Sales, Earnings and Relative Stock Values of the Leading Companies in the Rubber Manufacturing Industry According to Their Latest Financial Statements.

ONE of the most comprehensive financial surveys of the status of the leading rubber manufacturing companies and embodied in a comparative table has been prepared by Otis & Company, bankers of New York and Cleveland. The table is reproduced below and represents the most composite picture of the rubber industry yet presented.

The chart shows some very interesting facts. As pointed out by Otis & Company, as a general rule, earnings in an industry increase as volume of sales rises, or decreases as volume falls. The rubber industry has been a notable exception. The crude rubber situation has been the salient factor in the industry's prosperity and in the last few years has subjected the industry to hazards so great that capacity operations and a steadily improving operating efficiency has merely reduced the severity of losses. The relative stability of both crude rubber and cotton have materially helped the industry in the last eight months and a greater output, conducive to lower manufacturing costs, has made possible a great economy in distribution. A continuation of the present conditions within the industry will tend to entrench the financial position of all the companies now operating.

The chart below shows Goodyear leading United States Rubber, its nearest competitor, by nearly 30 per cent, with Goodrich third and Firestone fourth, in volume of sales. But there are other compensating factors. Firestone has the smallest funded indebtedness of the four plus the smallest number of outstanding shares of common stock. It consequently leads the field in the market value of its stock on the stock exchange, with the exception of General Rubber. It pre-eminently leads the field in earnings per share over the last three years, although earnings for 1929 are still unavailable, due to the fact that its fiscal year ends October 31.

It is interesting to note that of the thirteen concerns listed in the chart, eight are in the Akron district, and three Akron firms rank among the first five. Of the five larger companies, only the three in the Akron district show earnings on their common stock for 1928 and 1929. Their record of earnings is unbroken since 1927. Of the eight Akron companies listed only two failed to show common stock earnings through 1927 and 1928, and only one has failed to earn on the common stock for 1929. None of the out-of-Akron companies is paying common stock dividends.

Inventory turnovers, regarded as another indication of industrial well-being, also are significant. The lowest turnover listed for an Akron company is 3.6 times. The highest for an out-of-Akron company is 3.7 by Lee Rubber Company. The highest turnover of any Akron district concern is Seiberling's—7.7 times. Hood Rubber figures are not included because of its merger with Goodrich.

### Comparative Financial Position of the Leading Rubber Companies

| As of December 31, 1928 unless otherwise noted | GOODYEAR | UNITED STATES | GOODRICH | FIRESTONE (Oct. 31, 1928) | FISK | GENERAL (Nov. 30, 1928) | SEIBERLING (Oct. 31, 1928) | LEE (Oct. 31, 1928) | MOHAWK | INDIA | AJAX | KELLY | MILLER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Sales for 1928 | $550,700,000 | $190,400,521 | $148,000,173 | $128,664,608 | $ 60,933,941 | $ 58,154,000 | $ 16,329,111 | $ 11,082,914 | $ 6,580,646 | $ 5,012,559 | (x) | (x) | (x) |
| Funded Debt (a) | 83,128,455 | 102,473,400 | 24,200,502 | 23,967,200 | 17,700,000 | 0 | 0 | 0 | 625,000 | 0 | $ 2,339,000 | 0 | 0 |
| Preferred Stocks | 80,000,000 | 63,100,100 | 32,750,000 | 23,025,900 | 20,626,100 | 3,000,100 | 1,797,000 | 0 | 2,164,280 | 489,978 | 0 | $ 3,214,700 | $ 11,277,300 |
| Present Number Common Shares | 1,800,120 sh. | 1,416,304 sh. | 940,631 sh. | 370,000 sh. | 1,704,592 sh. | 62,674 sh. | 248,346 sh. | 300,000 sh. | 134,344 sh. | 50,000 sh. | 360,320 sh. | 1,000,340 sh. | 300,264 sh. |
| Market Price of Common 9/18/29 | 289 | 67 | 73 | 249 | 7½ | 250 | 30 | 12¼ | 39 | 40 | 4½ | 13 | 12½ |
| Market Valuation of Common | $522,400,280 | $ 66,306,000 | $ 69,610,000 | $ 19,000,000 | $ 12,700,000 | $ 20,000,000 | $ 7,500,000 | $ 3,750,000 | $ 4,450,000 | $ 3,320,000 | $ 3,930,000 | $ 12,700,000 | $ 3,514,000 |
| Par Value Prior Obligations | 163,427,255 | 107,004,600 | 66,903,502 | 46,992,400 | 38,226,100 | 3,000,100 | 1,797,000 | 0 | 2,789,280 | 489,978 | 2,339,000 | 3,214,700 | 11,277,300 |
| Total Market Valuation | $317,827,255 | $236,004,600 | $136,513,502 | $135,992,400 | $ 50,926,100 | $ 24,025,100 | $ 9,117,500 | $ 3,750,000 | $ 7,239,280 | $ 3,809,978 | $ 6,219,000 | $ 20,914,700 | $ 14,791,300 |
| Per Cent represented by Common | 49% | 28% | 51% | 48% | 25% | 84% | 82% | 100% | 62% | 87% | 63% | 60% | 24% |
| Capital added by Sale of Com. Stock (Then rights offered since Jan. 1, 1927) | $ 97,000,000 | $ 33,275,000 | $ 24,823,000 | ..... | $ 9,564,000 | ..... | ..... | ..... | $ 175,000 | ..... | $ 2,400,000 | $ 14,700,000 (b) | ... |
| Earned Per Share Present Common | | | | | | | | | | | | | |
| Year 1927 | $8.25 | nil | $9.75 | $32.97 | $0.67 | $21.00 | $5.04(f) | $2.61(f) | $4.31 | nil | nil | nil | nil |
| Year 1928 | 6.09 | nil | 5.17 | 14.43 | nil | 19.20 | 1.15 | 0.55 | 4.69 | nil | nil | nil | nil |
| First Half 1929 | 7.02 | nil | 4.11 | (x) | nil | (x) | (x) | 0.76 | 1.82 | 2.74 | (x) | (x) | (x) |
| Yield from Present Regular Dividend | 4.0% | ..... | 5.5% | 3.2% | ..... | 1.6% | 3.3% | ..... | 11.7%(h) | ..... | ..... | ..... | ... |
| Earned on Total Market Valuation (c) | | | | | | | | | | | | | |
| Year 1927 | 6.3% | 2.5% | 11.6% | 10.8% | 8.2% | 7.5% | 11.3%(f) | 20.9%(f) | 8.7% | nil | nil | 3.9% | nil |
| Year 1928 | 5.4% | nil | 4.6% | 6.0% | nil | 7.4% | 4.6% | 4.4% | 10.5% | nil | nil | nil | nil |
| Current Assets | $113,032,520 | $142,136,979 | $ 69,000,000 | $ 33,574,535 | $ 29,117,960 | $ 10,297,222 | $ 4,000,776 | $ 6,221,110 | $ 2,963,978 | $ 2,000,451 | $ 4,093,947 | $ 16,600,297 | $ 10,206,206 |
| Current Liabilities | 14,000,977 | 42,100,781 | 16,251,000 | 6,275,743 | 6,900,704 | 1,702,667 | 1,294,268 | 2,294,736 | 411,721 | 1,000,887 | 904,061 | 7,299,232 | 4,197,471 |
| Working Capital | 100,562,513 | 104,997,198 | 53,324,000 | 46,498,487 | 22,164,201 | 9,194,562 | 2,574,595 | 3,926,374 | 1,902,157 | 1,079,613 | 3,089,436 | 10,901,065 | 6,108,068 |
| Inventories | 62,702,251 | 62,343,518 | 31,807,000 | 24,752,510 | 17,422,010 | 4,600,355 | 2,119,435 | 2,903,003 | 934,767 | 927,934 | 2,067,912 | 7,027,000 | 3,453,425 |
| Net Cash Assets (Working Capital less Inventories) | 34,359,261 | 32,443,979 | 14,699,000 | 21,735,977 | 4,744,191 | 4,954,197 | 1,454,938 | 943,319 | 1,127,390 | 151,694 | 1,021,574 | 3,774,029 | 654,635 |
| Inventory Turnover (Sales divided by Inventories) | 8.8 | 3.0 | 4.0 | 5.1 | 3.5 | 6.4 | 7.7 | 3.7 | 5.0 | 5.4 | (x) | (x) | (x) |
| Net Tangible Assets per Com. Share (Adjusted to present capital) | $94 | $27 | $34 | $131 | $30 | $90 | $22 | $27 | $6 | $17 | $7 | $31(g) | $11 |

(a) Including funded debt and preferred stock of subsidiaries.
(b) Portion of which was used to retire funded debt of $9,643,000.
(c) Taking bonds and preferred stocks at par; common at market prices.
(f) Ten months' report; fiscal year changed.
(g) Including patents not shown separately.
(h) Including regular 4% in stock.
(x) Not available.

# *New Methods to Order and Inventory Control in Rubber Footwear*

## Inventories are Automatically Balanced—Daily Production Furnished Accounting Office by Tabulated Cards Permitting Prompt Charges to Stock and Credit to Factory—Tabulating Machines Eliminate Many Manual Operations

SOME of the possibilities for increased efficiency in rubber factories by the employment of tabulating machines were pointed out in a general way, in THE RUBBER AGE for March 10, 1929. That this is a subject of widespread interest was evidenced by the inquiries which the article brought forth. It is also a fact that many of the largest and most successful rubber companies are today employing machine control in many phases of their activities and are extending its use as fast as the details can be worked out and the personnel trained to carry it on.

Inventory control in rubber footwear has always been a difficult problem, but today its phases are more intricate than ever before. To visualize this one has only to realize the increase in specialty and novelty items such as cuff gaiters, fastener gaiters, and all-rubber gaiters with their many colors and styles. In studying the individual problem with a view to adopting machine control, analysis must first be made of the type of product and the method of distribution employed by the particular company. For example, a company doing a large branch warehouse business with a factory stock built up to give the branches the service they require on the one hand and to give the factory economical runs on the other, must employ a different method of approach than a company doing only a mail order and jobbing business and scheduling its factory production directly to customers' order.

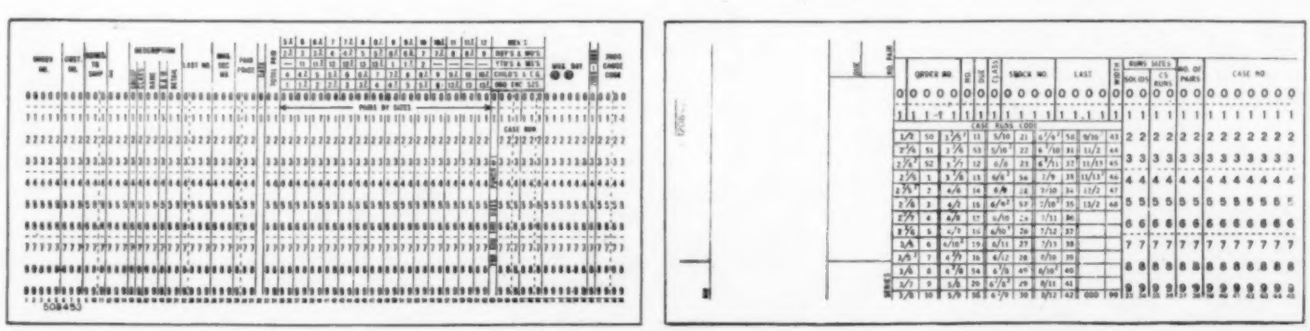
Tabulating machine cards are punched for production containing the name of the shoe expressed numerically by a stock number, the case run or size assortment or the number of pairs of a size in the case, the order number, customer number, either selling or cost price, and date. A card is punched for every case. On the packing date these cards are sent to the packing department. After the shoes are inspected and graded, the packer selects the cards which he is able to pack complete, and with a duplicate numbering stamp, stamps the case with a number and the card which designates the case with the same number. The card is returned to a key punch operator to have the extensions punched, and then is dropped into the inventory file of stock on hand. The entire set of cards for each day is run through the tabulator which prints, extends and totals the day's production, furnishing the accounting department with the charge to stock and credit to the factory.

Less than case lots due to drop-outs, work not made, etc., are kept in the packing room to be filled up as additional runs come through. They also form a basis for originating lacking tickets in case the run of a particular kind is completed. This system has the advantage of keeping the broken stock all in one place where concentrated effort can be made to keep it down to a minimum. To obtain the inventory at the end of a month, all that is necessary is to run the case stock through the tabulator and inventory physically the broken stock, which is a short task.

### *Cases in Stock Tabulated*

Let us turn now to the order control clerk who sits at a desk with drawers on each side containing tabulating cards of cases in stock. When an order is received, he first looks through his unreserved stock to see if it can be filled. Those items which can be filled in this manner are transferred from the unreserved to the reserved file. The balance is sent to the tabulating room to be punched up for production. A tabulation of these orders, together with stock orders originated by the planning department, furnishes the master ticket from which the production manager lays out the production schedule for a given period. The handling of this involves another phase of machine scheduling which will be discussed in a later article.

If the order clerk finds that an order can be filled complete he pulls the cards for the stock and sends them with the order to the shipping department for shipment. It will be recalled that each one of these cards bears a case number by which the particular case desired can be found. This has the advantage of preventing the shipment of goods on one order which had been reserved for another and also places in the control of the order department the insurance that the oldest goods will be shipped first, thus making certain



**Master Cards covering Production and Specific Orders. These are punched by Tabulating Machines, cover stock run, size assortment, etc., and furnish a full record of the day's production and shipments against orders**

that the inventory is turned over properly and always contains new stock. A tabulation of the cards of the cases shipped furnishes the accounting department with the daily shipments to check against the billings.

In another type of company which does a direct dealer business from the factory as well as a branch and jobber business, a different type of system is used. In the factory warehouse a rack stock of individual cartons and less than case lots is maintained for shipment of small orders to individual customers. Individual orders are filled from stock as far as possible and by means of spot checking inventory periodically, bulk orders are issued to the factory to build up stock on items on which maximum stock limits are placed. These orders, together with branch and jobber orders are sent to the tabulating department where they are punched up, one card to the case. This card contains the order number, customer number, stock number of the shoe, last number, making section number, total pairs, pairs by sizes, case run, with additional columns to be filled in when the shoes are produced. A tabulation of these cards furnishes the planning department with a complete list of orders to be produced. In laying out the plant schedule, the cards designated for production on a certain day are removed and run through the tabulator to print the plant schedule and also a packing instruction ticket. The packing department in this instance holds no production, either broken or unbroken, at the end of the day. Everything is forwarded to the finished goods warehouse, and broken cases are used for rack stock to fill small orders. The packer takes his packing instruction sheet and packs the orders in accordance with instructions making notations of exactly what he packs, together with the seconds and thirds and a code designation for the cause of the damage. The cards are punched and extended with this information and retabulated to give the accounting department the credit to production and charge to inventory. A tabulation of seconds and thirds gives the factory manager his daily report of seconds.

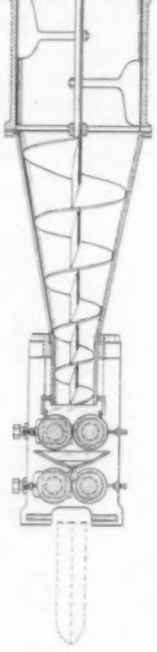
### *Inventory Balanced Automatically*

The orders shipped are punched by stock number and price to give the accounting department the credit to inventory and charge to accounts receivable. Thus a balance between stock on hand plus production minus shipments gives the inventory automatically. This system depends more on the personnel than the first one outlined particularly as to the care of stock and spot checking of inventory. But the more detailed entries on the order card pave the way for machine plant scheduling which is not contemplated in the first instance. The punching of shipments separately in the second case enables the orders to be coded by salesmen thus furnishing a check on compensation, statistics by territories, class of product, and other information extremely useful to the sales manager. Control of branch stock can be centralized at the home office as machine control at each branch is too expensive to operate for that phase alone. In the first case, while tabulating machines are not used at the branches, the case numbers are entered on cards and the stock controlled at the branch from a ticker file of these cards, only the rack or broken stock being inventoried physically as at the factory. This method has many advantages over the second instance.

It takes time and patience to install any system of machine control. Before it can be done, the product must be code numbered and the entire personnel, including the sales force, order clerks, shipping clerks, and factory production forces, must learn to recognize the different products by numbers without the written name or description although this can be added at the start to facilitate the installation. In the case of tires where sizes go by numerical designation anyway these can be used as they are with a code for the brand or type. Footwear probably presents the most difficult and complicated problem, and strange to say it is this branch of the industry which has made the most progress along these lines.

The machine methods involve the addition of some operations which do not exist or would not be required by manual methods. On the other hand the machine methods eliminate the need of many operations which are necessary under a manual method. As each phase of the work is transferred from the manual basis to the machine basis there would be a slight increase in total operating cost. Then as the machine method picks up speed and the manual methods are dropped the curve of cost drops below the previous cost, and this factor together with the greater speed, and more accurate control of inventories and production, makes the machine method a necessity for efficient operation.

## Compressing Carbon Black With Wheatley Press



THE new "fluffless" carbon black called "Disperso," produced by Wishnick-Tumpeer, Inc., is manufactured by the regular "channel" method. But it is in the compressing of the amorphous carbon that the Witco process eliminates certain disadvantages, state the producers.

Wishnick-Tumpeer, Inc., has secured rights to the Wheatley press illustrated herewith. The amorphous carbon is forced down through the conical shaped container, being simultaneously subjected to progressively increasing compression, until it is conveyed to the first set of compression rollers. Here it is further compressed and passes through to a second set of rolls, which break down the particle size to the absolute minimum.

By means of this progressive compression, all surplus occluded gases are eliminated. The "fluff," or air, is forced out and the size of the particles reduced to the minimum. The manufacturers claim that not only does carbon black made by this process disperse better in the rubber but the tensile is increased and stocks have better aging qualities.

## Rubber Oils as Larvicides

THE larvicidal value of oils distilled from scrap rubber have recently been investigated by the Malaria Advisory Board, Federated Malay States, and a short report of its findings has been published in the bulletin of the British Rubber Growers' Association.

Field experiments indicated that these oils were rapidly fatal to anopheline larvae, and that they spread quickly, forming thin, uniform films. Evaporation was more rapid than in the case of mineral oil, however, necessitating more frequent application. In comparison with mineral oil mixtures in general use by mosquito destruction boards, it was shown in the laboratory that while rubber oils were more toxic at first, a proportion of the larvae under test escaped, and after contact with water for some time the toxidity fell off. It was concluded that rubber oils were less reliable than mineral oil mixtures now in use, and further that rubber oils could not at present be sold at competitive prices.

# BOOK REVIEWS

STEARIC ACID SYMPOSIUM. Reprinted in pamphlet form from *Industrial and Engineering Chemistry*, August, 1929. Distributed with compliments of Binney & Smith Company. 1929. 59 pp.

The pamphlet presents the entire series of papers in full as read before the meeting of the New York Group of the Rubber Division, A. C. S., on March 20, 1929, and may be considered as a very comprehensive survey of the subject of stearic acid and its use in the rubber industry.

COMBINATION INNER TUBE PATCH MATERIAL. Laboratory Report No. 131-A, E. I. DuPont de Nemours & Company, Dyestuffs Department, Rubber Laboratory, Wilmington, Del.

The report covers the results of three years study in producing a face stock for repair materials which will remain tacky under all conditions of vulcanization and storage. Inner tube repair material made by spreading the unvulcanized face material, containing no vulcanizing agent, on the vulcanized back is expensive and at times unsatisfactory because of the poor adhesion between the two portions. The most serious objection to the more modern method of calendering together the backing containing sulfur and accelerators and the face stock without vulcanizing agents is that accelerators and sulfur have a tendency to migrate to the face during the cure. Recommendations are given in this report for overcoming these objections by the proper use of raw materials and compounding ingredients, and suggestions are also made as to manufacturing methods and curing.

ON THE REDUCTION OF RUBBER STRESS-STRAIN DETERMINATIONS. By W. B. Wiegand and H. A. Braendle. 1929. 16 pp.

In seeking means of eliminating the personal equation in the selection of stress-strain data, the authors of this paper found that the most probable or true values for tensile strength, elongation and intermediate values are not the arithmetic means but the modes. The method of selecting three highest elongations out of five together with corresponding tensiles was found most closely to approach modal values, and this method is advanced as a starting point for the standardized selection of rubber breaks. The paper was presented before the Boston Rubber Group last January.

CONVEYORS. Published by the National Safety Council, 108 East Ohio Street, Chicago, Ill. 1929. 8 pp.

Belt conveyors and eleven other types of conveyors are considered in this revised edition of Safe Practices Pamphlet No. 35. General and specific suggestions for the use of each type, compiled from actual experience in accident prevention, make up the text of the paper.

MERGERS IN INDUSTRY. Published by the National Industrial Conference Board, Inc., 247 Park Avenue, New York City. 1929. 220 pp.

Consolidations in industry are part of a movement characteristic of our modern economic organization. The authors of this volume conclude from an exhaustive consideration of statistical material that in a very practical and substantial way industrial mergers have been an economic benefit to the community. However, it is pointed out that not all mergers have been successful, and a table is presented of 48 combinations which went into receivership or reorganized before 1914.

SULLE DEFORMAZIONI FINITE DELLA GOMMA. By Rafaele Ariano. Published by the Libreria Editrice Politecnica, Via Giovanni Pascoli, 64, Milan, Italy. 1929. 24 pp.

This paper on the shaping of rubber is reprinted from the proceedings of the Milan Seminary of Mathematics and Physics.

AMERICAN STANDARDS YEARBOOK. Published by the American Standards Association, 29 West 39th Street, New York City. 1929. 88 pp.

Important developments in the national standardization activities of almost every major American industry are described in this annual review, about 150 national standards already completed and 175 other national projects under way being listed. The Rubber Manufacturers' Association has co-operated in setting up several of these, including the safety code for walkway surfaces, the safety code for rubber machinery, the standardization of screw threads for hose couplings other than fire hose couplings, the aeronautic safety code, the cotton rubber-lined fire hose standard, and fire fighting equipment in metal mines.

# Why Not More Sponge Rubber

(*Continued from page 664*)

pansion is complete, the article should vulcanize rather rapidly throughout its entire volume. Finally, acceleration should be such that vulcanization is uniform throughout the article.

Some organic colors are unaffected by the alkaline sponging chemicals, and may be successfully used in articles cured at relatively low temperatures.

Mixing is accomplished in the usual manner, excepting that batches are small, and mills must be very efficiently cooled. The same applies to tubing and calendering.

It seems almost unnecessary to remark that the unit for producing sponge rubber articles should be completely separated from that in which solid rubber goods are made. This, of course, is due to disastrous results that would follow if any sponge rubber compounds were inadvertently mixed up with solid rubber ones.

### Vulcanizing

Types 1 and 2, small and medium pore, are usually molded. Type 3, large pore, may be molded or cured in open steam. The main problems of vulcanization have been considered under "compounding and mixing" above. There is one other problem that is rather troublesome and warrants some investigation with a view to improvement. This pertains to the elimination of air trapped in the molds. Of course, the uncured sponge article does not originally completely fill the mold cavity. However, during the course of vulcanization it expands to completely fill the cavity. The displaced air must be eliminated to produce articles free of "air marks." This is accomplished at present by venting irregular molds. Flat articles are vulcanized on cloth to "bleed" the trapped air. The former method produces unsightly "teats," and the latter is expensive, due to the short life of the cloth.

### Conclusion

The above article is a recital of difficulties encountered in sponge rubber manufacture. However, in spite of them and our present limited knowledge of the chemistry and physics of sponge rubber, a few American companies are manufacturing it on a comparatively small scale successfully and profitably. These difficulties are no greater than those confronting the entire industry along about 1905. Those were solved as these can be. It seems to the writer that if a systematic investigation of the possibilities of sponge rubber were undertaken from the commercial as well as the scientific standpoint, it would result in helping to open up profitable new avenues to American manufacturers.

## Tire Inventories Lower in July

OUTPUT of pneumatic casings of all types by tire manufacturers in the United States dropped during July to 6,474,988, according to statistics compiled by the Rubber Manufacturers Association, Inc. Shipments were higher, ballon casing and tube shipments setting an all-time record, and inventories finally showed a decline.

TIRE AND TUBE PRODUCTION
(All Figures Represent Thousands)

| | June, 1929 | | | July, 1929 | | |
|---|---|---|---|---|---|---|
| | Prod. | Ship. | Invent. | Prod. | Ship. | Invent. |
| Pneumatic Casings: | | | | | | |
| All types | 7,304 | 7,254 | 17,957 | 6,475 | 7,855 | 15,830 |
| Balloon | 5,631 | 5,106 | 12,629 | 4,919 | 5,591 | 11,354 |
| High Pressure Cord | 1,666 | 2,126 | 5,276 | 1,550 | 2,254 | 4,434 |
| High Pressure Fabric | 6 | 23 | 52 | 6 | 10 | 42 |
| Solid and Cushion Tires | 53 | 54 | 176 | 51 | 54 | 170 |
| Inner Tubes: | | | | | | |
| All types | 6,978 | 6,950 | 18,741 | 6,178 | 8,113 | 16,332 |
| Balloon | 5,399 | 4,681 | 12,873 | 4,332 | 5,261 | 11,589 |
| High Pressure | 1,570 | 2,265 | 5,845 | 1,843 | 2,847 | 4,721 |

ATLANTIC CITY'S FINEST RESIDENTIAL HOTEL

**On the Boardwalk**

*In the Quiet and Exclusive Chelsea Section*

500 Rooms with Sea Water Baths
American and European Plans

Sea Water Swimming Pool—Concert Orchestra—Turkish and Cabinet Baths—Spacious Sun Deck—Fireproof Construction

Also Housekeeping Apartments Consisting of 1, 2, 3, and 4 Rooms with Complete Hotel Service by the Week, Month or Year

*Under the Management of*
CHARLES D. BOUGHTON

PRESIDENT HOTEL
BOARDWALK AT ALBANY AVE.

*Now open in NEW YORK*

*The Beautiful New Hotel*
PLYMOUTH
49th ST. EAST of BROADWAY

$2.50 DAILY — For a Room Equipped with Bath, Circulating Ice Water and RADIO!

Single .....$2.50, $3.00, and $3.50
Double, $4.00 & $4.50; Twin Beds, $5.00

NEAR BUSINESS, SHOPPING and THEATRE CENTERS

# *What's Your Answer?*

When some associate asks, "Did you read the article on 'So and So' in the last issue of THE RUBBER AGE?" what will your answer be?

If you have to rely strictly on the office copy, where you may get a hasty glance at each issue before it is routed to the next name on the list, your answer will probably be "No."

The solution is to get a personal copy sent to your home. There you can read in comfort and in more leisure and you know you won't be missing any of the important articles which might otherwise be overlooked. Just send Two Dollars for a year's subscription (or Five Dollars for three years) to THE RUBBER AGE, 250 West 57th Street, New York City, and you'll get the first issue within a few days.

**Have a personal copy of THE RUBBER AGE sent to your home!**

# EDITORIAL COMMENT

## Merging and Centralizing

LEADING economists and business diagnosticians have stressed the trend towards industrial mergers as the leading movement in industrial development during the past eight months. The rubber industry has not escaped this epidemic. Generally accepted economic thought has favored the principle of the merging of small units into larger organizations as a step toward greater economy in operation and greater efficiency in management and in the instance of all the recent mergers effected in the rubber industry it would seem that they should prove beneficial to the respective companies.

The outstanding merger of the year has been the Goodrich-Hood combine wherein Goodrich absorbed the Hood Rubber Company and thereby increased its capitalization by $30,000,000. Second in importance was when Manhattan-Raybestos, Inc., was formed by the combination of the Manhattan Rubber Manufacturing Company, Raybestos Company and the United States Asbestos Company.

Other mergers formed included the American Tire and Rubber Company, which was bought by Fidelity Tire and Rubber Company; Lambert-Raritan, Inc., a combination of the Lambert Rubber Company and Raritan Rubber, Inc.; Bucyrus Rubber Company purchased by Swan River Tire Company; C. O. Tingley & Company and Reliance Rubber Corporation, forming the Tingley-Reliance Corp.; Erie Rubber Company purchased by Swinehart Tire and Rubber Company; and the alliance of the Southern Asbestos Company with the Thermoid Company, which is still pending.

This tendency to combine has been also apparent amongst the chemical and machinery concerns supplying the rubber industry. The American Cyanamid Company recently absorbed Kalbfleisch Corporation and E. I. duPont de Nemours and Company had taken over the Grasselli Chemical Company. The Monsanto Chemical Company recently acquired Rubber Service Laboratories Company. One of the most important combinations amongst suppliers of the rubber industry was the merger a year and a half ago of the Akron Rubber Mold and Machine Company, DeMattia Brothers, Inc., DeMattia Foundry and Machine Company, Kuhlke Machine Company and Banner Machine Company into the National Rubber Machinery Company. The soundness of this combination has already been evidenced in substantial dividend returns.

Besides this tendency to merge, we also have the example of such big companies as the United States Rubber Company centralizing their manufacturing efforts through the closing down of some of their many plants and concentrating production in others. The concentration of the tire manufacturing activities of United States Rubber Company in their Detroit plant is the chief case in point.

Much good can come to the industry in general from these combinations, not only in economy and efficiency but also in clearing away needless and futile competition and improving the marketing facilities of the industry.

---

## The Chemists at Work and Play

ON ONLY one other occasion, several years ago, has the Rubber Division of the American Chemical Society held its meeting separately from that of the parent organization. That was when the Society held its spring meeting on the West Coast, and the Rubber Division met in Akron. It is remarkable how this technical fraternity can join in a semi-annual get-together that eclipses any Rotarian or Kiwanis meeting, but they do,—and not only do they exchange many new and valuable views on the technical problems of their industry but they make it a real opportunity to enjoy a well deserved relaxation.

This year's session of the Rubber Division at Atlantic City is divorced from the regular meeting of the American Chemical Society, held early this month at Minneapolis, Minnesota, but the grounds for such a "temporary separation" were justified in view of the long distance from the rubber manufacturing centers to Minneapolis, necessitating more than a full week's absence, whereas the Rubber Division's meeting at Atlantic City need only consume four or five days, even for those coming from as far west as Chicago.

The program at Atlantic City has been well planned and the resultant papers should prove valuable contributions to the literature of rubber chemistry. The success of the meeting, judging from the responses from the membership of the Division, is assured.

It is a tribute to the Rubber Division that a separate conference could be held without opposition from the parent organization,—it is a recognition that the Rubber Division groups have demonstrated their fitness to produce a highly scientific and a worthy presentation of their industry's problems in a manner wholly satisfactory to the parent authority.

The RUBBER AGE

*Published on the 10th and 25th of each month.*
*The Only Twice-a-Month Rubber Publication.*

THE PALMERTON PUBLISHING CO., INC.
**Editorial Office, 250 West 57th St., New York City**
Telephones: Columbus 2923, 2924

**THE RUBBER AGE is published on the 10th and 25th of each month by The Palmerton Publishing Co., Inc., a New York corporation. P. L. Palmerton, President; Earl D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer. Publication Office, 1-3 Pence St., New Brunswick, N. J. Subscription rates: Domestic, $2.00 a year; Canada, $2.50; foreign, $3.00; single copies, up to 3 months old, 20c; over 3 months old, 50c. Advertising rates on application.**

*Contents Copyrighted 1929 by The Palmerton Publishing Co., Inc.*

*General Manager*.....PETER P. PINTO
*Managing Editor*.....J. P. BUSHNELL
*Assistant Editor*.....T. H. DAVISON
*Circulation Manager*.....A. M. SMITH

*Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.*

# AERO BRAND

## *RUBBER CHEMICALS*

| | |
|---|---|
| *D. P. G.* | —After eight years of steadily increasing popularity, still one of the most widely used accelerators. |
| *D. O. T. G.* | —In its field, second only to D. P. G. in volume of use. |
| *Accelerator No. 49* | —A disubstituted guanidine, mid-way in strength between D. P. G. and D. O. T. G. |
| *Rubber Sulphur* | —Carefully ground to your specifications, air-floated and bolted through silk. |

Our resources, careful technical control of manufacturing, and ample warehouse stocks assure uniformly dependable products and prompt deliveries.

*Specify Aero Brand*

**AMERICAN CYANAMID CO.**
535 Fifth Avenue New York

COOPER GUARANTEED PRODUCT

## QUALITY CHEMICALS
for the
## RUBBER INDUSTRY
**Stocked at Akron, Ohio.**

Aniline Oil
Pine Tars
Co-Flux
Gasoline
Soap Bark
Palm Oils
Hardwood Pitch

**R. A. SPERRY**
**Akron Manager**
**134 E. Miller Ave.**
*Phone*
**Main 1898**

Red Oxide
Benzol
Toluol
Sol. Naphtha
Crude Sol. Naphtha
Naphthalene
Cresylic Acid

**WILLIAM COOPER & NEPHEWS**
INCORPORATED
1909-25 CLIFTON AVE. CHICAGO, ILL.

# SPECIAL SOFTENERS

*—Better Working Properties before Cure*
*—Improved Vulcanized Quality*
*—Lower Raw Materials Cost*

# TASCO ASPHALT COMPANY

Akron Representative
The F. F. Myers Co.
Akron Savings & Loan Bldg.

HOME OFFICE
238 Wilson Ave.,
Newark, N. J.

Trenton Representative
F. V. Bechtel
289 North Willow St.

*Warehouse Deliveries from All Agencies*

# NEWS of the INDUSTRY

*Financial—Business*
*Building Operations*
*Personals*
*New Products*

## B. F. GOODRICH TO BUILD BUENOS AIRES FACTORY

Paul R. Mahoney, executive vice-president of the B. F. Goodrich Company, has announced that negotiations have been closed for a factory site for his company in Argentina, according to a Buenos Aires dispatch. The new plant will be located at Quilmes, a suburb of Buenos Aires.

The new tire and rubber goods factory, Mr. Mahoney said, would employ approximately 1,200 men and would probably be the first plant to be built in South America by any American rubber manufacturer. The Goodyear Tire & Rubber Company declared its intention of buying a plant site in Argentina recently, and P. W. Litchfield, president of that company, has sailed for Buenos Aires to make a tour of inspection.

## GOODYEAR SELLS AIRSHIP TO MASSACHUSETTS FIRM

The Goodyear-Zeppelin Corporation, through its officials, confirmed early this month the sale of a Puritan type dirigible to a syndicate of Massachusetts men from Dartmouth, Fall River and New Bedford, to be known as the New England Airship Company. The ship will be constructed for delivery by May 1, 1930, and Goodyear will release trained men to pilot the ship, a policy to be carried out with respect to all future sales to private enterprises.

The New Englanders will have the honor of establishing the first commercial airship operating company in the United States. The ship will be used for passenger flights, advertising, photographic work, and traffic surveys. It will carry four passengers including the pilot, will have a helium capacity of 186,000 cubic feet, a length of 128 feet, and a width of 37 feet.

## ANACONDA PURCHASES MARION WIRE & RUBBER

The Anaconda Copper Mining Company has announced the acquisition, through its subsidiary, the Anaconda Wire & Cable Company, of the assets and business of the Marion Insulated Wire & Rubber Company of Marion, Ind. The negotiations, which covered several months, were concluded on a basis of stock exchange and cash, the details of which were not announced.

The Marion concern gives the Anaconda company its first unit in the middle west and provides a plant in that territory for the manufacture of rubber-covered wires and cables. In line with the policy of the Anaconda company, the announcement stated, the management of the Marion company will be merged with the organization of the Anaconda Wire & Cable Company.

## H. G. KELLER RESIGNS AS MASON TIRE PRESIDENT

Henry Garrison Keller, who was elected president of the Mason Tire & Rubber Company, Kent, O., after its reorganization last February, announced his resignation from that position on September 12. He declined to announce his future plans, and the company has not as yet revealed the identity of his successor.

Mr. Keller, a University of Pennsylvania graduate, came to the Mason company with

H. G. KELLER

a wide experience in the management of manufacturing plants and the study of market conditions. One of the first plants in England to manufacture roller bearings was designed, equipped and managed by Mr. Keller. In recent years he has been associated with Ford, Bacon & Davis, of New York City, and Ralph E. Davis, of Pittsburgh, in the valuation of public utility and industrial plants and in the study of markets and market conditions for proposed utilities.

## FISK OFFERS DEALERS TIRE AND RIM MANUAL

A very complete Wheel and Rim Manual containing data on tire changeovers from single to dual solids, from solid tire equipment to single pneumatics and from solids to dual pneumatics has been prepared and distributed by the commercial tire department of the Fisk Tire Company, Inc., Chicopee Falls, Massachusetts.

The manual was published for the use of Fisk dealers in helping to solve the problem of rapid and economical transportation for truck and fleet owners.

## ENDICOTT-JOHNSON BUILD RUBBER FOOTWEAR PLANT

The Endicott-Johnson Corporation, Johnson City, N. Y., has announced plans for a new plant for the manufacture of rubber footwear. It is estimated that the plant will cost $200,000 and will be five stories in height and 60 by 240 feet in size. The capacity of the additional plant when completed will be 10,000 pairs of rubber footwear a day.

"This branch of the company's business is growing rapidly and gives promise of a large future development," said George F. Johnson, president of the corporation, in announcing plans for the new factory.

All Endicott-Johnson shoe factories and this rubber heel plant are now being operated at full capacity production, and President Johnson says orders on hand are sufficient to maintain full production schedules for a number of months to come. Orders and shipments in July were more than 50 per cent above the same month of last year, while August shipments and orders also are ahead of 1928 by from 50 to 60 per cent.

## MAIL ORDER COMPANIES OPEN NEW TIRE STORES

Montgomery Ward & Company will open a chain of 10 tire stores in Chicago, according to George B. Everitt, president. The stores will handle accessories as well as tires and will mark the first move in establishing multiple retail outlets, carrying the company's retail sales organization in expansion beyond its old policy which included only retail department stores. Counting its retail store at the main plant, the new chain will provide 11 retail units in Chicago.

Seven additional tire and accessory stores in the vicinity of Chicago and 11 similar stores in eastern cities will be opened by Sears, Roebuck & Company within a short time, R. E. Wood, president, announced recently. During the past four months, $15,000,000 have been invested in new retail units. Five new tire and accessory stores are to be established in Boston, three in Philadelphia, and three in Detroit. Since January, the company has opened 22 department stores in large cities and 62 smaller retail units in 24 states.

## Dirigible Engine Contract

The Maybach Works, Friedrichshafen, Germany, has been commissioned to build eight motors for the dirigible ZRS-4, which is soon to be constructed at the plant of the Goodyear-Zeppelin Corporation, Akron, O. The motors, which will be duplicates of those used in the Graf Zeppelin, will be of 500 horsepower each.

## AKRON RUBBER GROUP TO MEET ON OCTOBER 14TH

The second meeting of the Akron Rubber Group for 1929 will be held on October 14, with K. D. Smith, of the B. F. Goodrich Co., in charge of the program. Through his efforts and acquaintance in the trade, a number of experts have consented to appear on a program dealing exclusively with problems relating to the design of tires.

J. G. Swain, of the Firestone Steel Products Co., will give a discussion of "Rims and Their Relation to Tires." The subject of the second paper by V. L. Smithers, of Smithers, Inc., will be "Present Tendencies in Tire Design and Construction." The third subject will be "Indoor and Outdoor Testing of Tires." This will be presented by J. C. Sproull, of the B. F. Goodrich Co.

The meeting is being held by courtesy of the B. F. Goodrich Co. in the K of C Club, 282 W. Market Street, Akron. Tickets will be on sale by various members of the group.

## RUBBER EXCHANGE NAMES OFFICERS FOR NEW YEAR

Francis R. Henderson, president of the Rubber Exchange of New York, has been renominated for that office by the nominating committee which named a full slate of officers to be voted on at the annual election October 15. The full list follows:

President, Francis R. Henderson; vice-president, Charles T. Wilson; treasurer, J. Chester Cuppia; members of the board of governors, Harold L. Bache, William E. Bruyn, James T. Bryan, Herbert S. DeLanie, J. Frank Dunbar, Jr., John L. Handy, John L. Julian, David S. Kubie, Jerome Lewine, Fred Pusinelli, William H. Stiles, and Edward J. Wade; inspectors of election, William D. Paul, Frank D. Pressinger, and Bradford P. Burleigh.

## TIRE MANUAL IS ISSUED BY RUBBER ASSOCIATION

"Tire Tips" is the title of a new booklet on the care of pneumatic tires for passenger cars issued by the Rubber Manufacturers' Association, in the interests of tire users, to promote a better understanding and observance of a few simple precautions necessary to obtain long wear from their tires. Photographs are used in this sixteen-page leaflet to illustrate the more common tire failures resulting from misuse and the text explains the best way to avoid them.

The first edition of Tire Tips will number three and one-half million copies. The majority will be distributed to purchasers of new cars—a copy accompanying the instruction book supplied by the car manufacturer. The balance will be distributed to the public by the tire manufacturers through their branches and dealers. Individuals who may wish copies should ask their local tire dealers for them.

DARIUS E. PECK, assistant manager of the law department of the General Electric Company since 1920, was elected vice-president and general counsel at a meeting of the board in New York City recently.

### Los Angeles Group Meeting

The eighth meeting of the Los Angeles Group of the Rubber Division of the American Chemical Society was held at the Pollyanna Tea Room, Los Angeles, on September 20. Following a dinner for the members, there was an address by C. R. Johnson, of Godfrey L. Cabot, Inc., on "Carbon Blacks." The next morning Mr. Johnson left by airplane for Kansas City on his way to address the Atlantic City Rubber Division meeting.

### Rubber Glove Co. Expands

The Kent Rubber Products Company, Kent, O., will move its plant to Ravenna, O., where it is expected to erect a new factory on a site furnished by the local Chamber of Commerce covering three acres.

The company have been operating for the past two years in Kent in the manufacture of high-grade electricians' gloves and their success now warrants an expansion of the business.

### Dictated Translation Service

A new feature of the reference service of Smith & Smith, 455 Chestnut Boulevard, Cuyahoga Falls, is that of dictated translation. This service is offered to companies and individuals in the Akron area and to those companies having branch offices in Akron who can have the dictation taken by their own stenographer. To others, the service is offered on the basis of a time rate to Smith & Smith for the dictation time, and a stenographer's charge for dictation and typing. The cost is considerably less than if the translation is made at standard word rates. Dictation time varies considerably but in general the saving in cost is about 30 per cent to 50 per cent.

## INDIA ANNOUNCES GAINS AND NEW APPOINTMENTS

Announcements of changes in the executive staff of the India Tire and Rubber Company, Akron, O., and a resume of the company's outlook were recently made by company officials.

John T. Fisher, former secretary and treasurer of the Federal Match Cooperative Chicago, has been appointed comptroller of the company.

S. N. Farmer, formerly of Polson Rubber Company, Garrettsville, O., and the House of Hubbell, Cleveland, advertising agency, has been promoted from sales promotion manager to advertising manager. G. R. Murray has been made assistant credit manager.

The resume on the company's prospects for the year states that they "are brighter than at any time in the company's history. The most remarkable success in the history of India is the development of new dealer business," it was declared.

"In the first half of 1929 as many new accounts were signed up as the company had old accounts at the end of 1928. India's recent announcement of the Whitewall Tire has brought orders in far beyond expectations."

## GENERAL TIRE SALES AT PEAK IN THIRD QUARTER

According to William O'Neil, president, the General Tire & Rubber Company is closing the third quarter of the year with sales at the highest point during all of 1929. "While August was the company's peak month for sales in 1928," he states, "sales in August this year have been 20 per cent greater than for that month last year.

"Sales for the first three quarters have shown a little less than 10 per cent over the same period of 1928. We expect no decrease in demand for tires during the balance of the year."

### Struthers Wells-Titusville

The Struthers Wells-Titusville Corporation, a consolidation of the Titusville Iron Works, Titusville Forge Company and Struthers Wells Company, has reported earnings for the first six months of 1929 as $178,963, slightly more than for the entire year of 1928 and equal to $2.13 a share on the 83,750 shares of common stock. Profit for the full current year is expected to run over $4 a share. The company manufactures various types of machine equipment for rubber and electrical concerns, in addition to steam, oil and gasoline engines, oil well equipment and forgings.

### Garlock Declares Dividend

The Garlock Packing Company, Palmyra, N. Y., manufacturer of rubber and other mechanical packings, has declared an initial dividend of 30 cents a share on the common stock, of which there are 200,000 shares outstanding. On that share basis the company in 1928 earned $2.88 a share, but profits are expected to be higher this year.

### Rubber Stocks Inactive

Except for a short buying movement in United States Rubber, the stock issues of rubber manufacturing companies were quiet on the various exchanges and generally lower. Goodrich, Seiberling, India, and Goodyear preferred made new lows for 1929, and Faultless suddenly rallied to a new high. Share prices on September 18 compare as follows:

| | Last Price Sept. 18 | Last Price Sept. 4 | High —1929— | Low —1929— |
|---|---|---|---|---|
| Ajax | 4⅛ | 4⅜ | 11¼ | 4 |
| Falls | 4 | 4 | 11⅝ | 4 |
| Faultless | 42 | 33 | 42 | 30 |
| Firestone | 227 | 240¼ | 309 | 220⅛ |
| do. 6% pfd. | 109 | 109¾ | 111 | 108 |
| Fisk | 8 | 8⅝ | 20⅛ | 6½ |
| do. 1st pfd. | 42¼ | 42⅛ | 72½ | 35⅝ |
| General | 256 | 250 | 298 | 236 |
| do. pfd. | 95 | 94 | 102 | 93 |
| Goodrich | 72½ | 72⅝ | 105¾ | 70⅜ |
| do. pfd. | — | — | 115¼ | 111 |
| Goodyear Com. | 109¾ | 111 | 154½ | 103 |
| do. pr. pfd. | 101 | 101½ | 104⅞ | 99⅝ |
| India | 35 | 40 | 73 | 35 |
| Intercontinental | 9¼ | 8½ | 14¼ | 8⅛ |
| Kelly Springfield | 10 | 10½ | 24 | 9⅞ |
| do. 1st pfd. | — | — | 109 | 58⅝ |
| Lee | — | 12¼ | 25 | 10 |
| Miller | 11½ | 13⅝ | 28¾ | 11½ |
| do. pfd. | 41 | — | 83 | 41 |
| Mohawk | 27½ | — | 66 | 27½ |
| do. pfd. | 78 | — | 90½ | 78 |
| Norwalk | — | 2¼ | 6⅛ | 1¾ |
| Pirelli | 62½ | 63 | 68 | 50½ |
| Seiberling | 27¼ | 28⅞ | 65 | 25 |
| do. pfd. | 90 | 104 | 107¾ | 90 |
| U. S. Rubber | 55⅝ | 45½ | 65 | 42 |
| do. pfd. | 77 | 70¼ | 92½ | 67½ |

## THERMOID WILL ABSORB SOUTHERN ASBESTOS CO.

Negotiations are now under way to effect a complete merger of the Southern Asbestos Company with the Thermoid Company, Trenton, N. J., manufacturers of brake lining and of mechanical rubber goods. The Thermoid Company is a holding company organized in February of this year to take over the Thermoid Rubber Company and the Stokes Asbestos Company. In April, it acquired 51 per cent of the stock of the Southern Asbestos Company and now wishes to absorb the remainder of the outstanding holdings in that firm.

In a letter to stockholders, R. J. Stokes, president of Thermoid, states his company is offering to exchange four and one-third shares of its 7 per cent preferred stock for ten shares of Southern Asbestos common stock. The offer expires October 10.

In event of the consummation of the merger, Thermoid will have outstanding about 36,000 shares of 7 per cent preferred stock and about 237,500 shares of common stock.

Mr. Stokes has just announced an expansion of the executive personnel of Thermoid, which is due to the rapidly increasing business of the company. Gains in the automotive and mechanical rubber goods divisions have been so material that separate sales managers have been appointed for each division in anticipation of the enlargement of the sales organization.

Robert Lee, who has been general sales manager for the past five years, has been elected vice-president and will be associated in the general management of the company. James A. Wheatley, Jr., has been promoted from Pacific Coast manager to sales manager of the automotive division. Lloyd R. Leaver, for several years Chicago manager of mechanical rubber goods, has been made sales manager of the mechanical division.

## GOODYEAR PRODUCES NEW AIR WHEEL

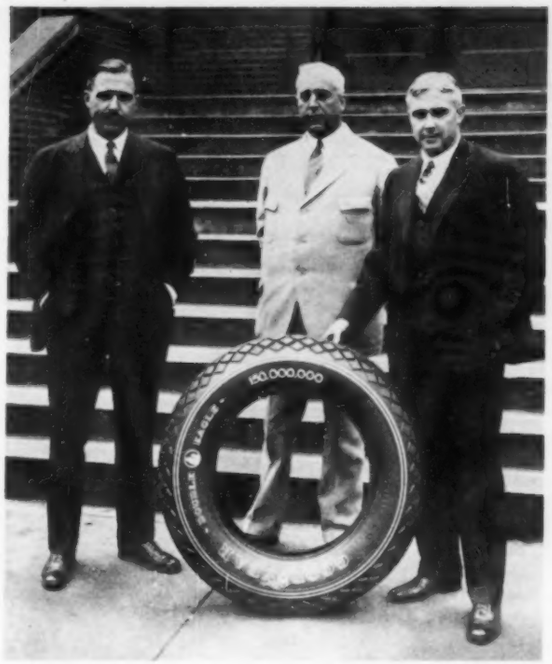
The Goodyear Tire and Rubber Company has entered production on the new "Air Wheel" following the completion of tests.

The "Air Wheel," Musselman type, was designed to increase the safety factor in airplane landings and takeoffs. It marks a radical departure from present-day airplane tires, and is a full balloon casing mounted directly upon a hub attached to the undercarriage, eliminating rim, spoke and wheel.

The name is appropriate inasmuch as the new tire performs the dual function of cushioning and wheel. Goodyear engineers expect the "Air Wheel" to supplant auxiliary shock absorbers, thus adding to the useful load-carrying possibilities of heavier-than-air craft.

## Cincinnati Belting Manual

The Cincinnati Rubber Manufacturing Company has issued a new publication for the trade under the title of "Belting Facts and Figures." While small in size, the data included cover practically everything pertaining to transmission, conveying and elevating, with rules, formulae, and mathematical tables.




## Goodyear Produces 150,000,000th Tire

**The Goodyear Tire & Rubber Company on August 28 set a new record in automobile tire production when tire No. 150,000,000 was turned out. It is shown here with R. S. Wilson, left, vice-president and sales manager, President P. W. Litchfield, center, and Vice-President C. C. Slusser, factory manager, holding the tire.**

**The Goodyear organization made its 100,000,000th tire in April, 1927, after 24 years of continuous production. The new mark was set by producing 50,000,000 tires, or half as much, in two years and four months.**

## Receiver for N. J. Corporation

Chancellor Edwin Robert Walker, of Trentor, N. J., has appointed William J. Connor as receiver for the Fidelity Industrial Corporation, Yardville, N. J., formerly known at the Fisk Flap Tube Rubber Company. The receivership was asked by Counselor Paul H. Wemdel, who alleged that the company was insolvent and that dissipation of the assets was threatened through legal action. Mr. Wendel holds 1,001 shares in the corporation. The company was organized by the late C. Francis Fisk, who manufactured a patented rubber flap tube.

## Goodrich Plane Fifth in Race

Lee Schoenhair, piloting the "Miss Silvertown" plane of the B. F. Goodrich Company, overtoook all but four of the airplanes which preceded him on their way from Cleveland to Toronto in the handicap derby held on September 4 in connection with the National Air Races. Schoenhair's powerful plane started with the greatest handicap of the 14 entrants, leaving the Cleveland airport one hour and seven minutes after the first plane had taken off, but on the way he overtook eight planes. The race was won by M. D. Hackman of Farmingdale, N. Y.

## M. E. A. Credit Convention

Credit executives of several hundred automotive parts, accessory and equipment manufacturers heard addresses by nationally known business authorities at the annual credit conference of the Motor and Equipment Association at Cleveland on September 19. After an opening address by N. H. Boynton, National Lamp Works, president of the association, there were talks by Elton R. Seager, Pennsylvania Rubber & Supply Company, on "Trends in Wholesaling"; Hon. C. D. Friebolin on "Solving the Problems of the Insolvent"; and W. L. Thorp on "Facts About the Consolidation and Merger Movement and the Concentration of Industry."

## PATENTS ASSIGNED TO AKRON RUBBER FIRMS

Several patents on machinery and processes used in the rubber industry have been assigned in the past few weeks to Akron rubber companies by the inventors. A patent on machinery and methods of manufacturing inner tubes granted to Herman T. Kraft on 22 claims has been assigned to the Goodyear Tire & Rubber Company, of which he is an employe.

Goodyear also is assignee for a patent on a safety device for bias cutting machines, granted to L. Wetmore, of Almeda, Calif.; a slug cutting machine invented by V. V. Messer, Douglaston, N. Y., and a cutting device for street fabrics, invented by W. H. Gerstonslager, another Goodyear employe in Akron.

The Rubber Service Laboratories Company is assignee for two inventions, both on processes for manufacturing rubber curing chemicals. One process is the invention of C. N. Hand and C. E. Smith, and the other by T. W. Bartran and W. C. Weltman, employes of the company at Nitro, W. Va.

Robert Iredell and I. J. Remark, employes of the General Tire & Rubber Company, were granted a patent on a windup mechanism for bias cutters, and the patent has been assigned to that company. A process for making dyes from rubber derivatives, invented by Harry L. Fisher, B. F. Goodrich Company chemist, has been assigned to that company.

## Marathon Plant Dismantled

Dismantling of the Marathon Tire & Rubber Company machinery in accordance with plans of the parent company, the Goodyear Tire & Rubber Company, was started early this month. Machinery, molds, and stocks are being removed from the Cuyahoga Falls factory to the Goodyear plants at Akron, where the Marathon line will be continued. Plans for the disposal of the Marathon factory buildings have not as yet been decided upon.

# Rubber News Around the World

## LIVERPOOL GAINS AS A RUBBER IMPORT CENTER

*The Liverpool Trade Review*, the monthly organ of the Liverpool Chamber of Commerce, comments on the steady increase which is taking place in the imports of raw rubber into Liverpool. The increase is not merely temporary, but is a gradual move in favor of the port which is being selected as an advantageous center from which to distribute to the increasing rubber manufacturers of the country.

In the year ended June, 1928, imports of rubber into England totalled 101,412 tons. Of this quantity 94,579 tons went into London and only 6,815 tons came into Liverpool. In the twelve months ended June 30, 1929, the import into England was 97,028 tons. The share of this by Liverpool was 10,649 tons—an increase of 3,834 tons compared with the earlier period. The import into London in the twelve months was 86,379 tons, as against 94,597 tons in the previous year.

The totals for the month of June, 1929, compared with those for June, 1928, are still better. Imports in June, 1929, into England were represented by 7,971 tons. Of this 6,964 tons were landed at London and 1,007 tons at Liverpool. In June, 1928, only 528 tons of a total import of 7,810 tons were landed at Liverpool.

### Golf Ball Imports Higher

Imports of golf balls during July numbered 367,608, valued at $120,853, a unit value of 32.9 cents per ball, as compared to 30.9 cents in June and 28.5 cents in May. Imports in June totaled 359,480 and in July, 1928, amounted to 360,476. All balls imported during July, 1929, were received from the United Kingdom.

JOHN HENRY STOLL, of the international cotton house of Strauss & Company, with offices at Dallas, Tex., and Liverpool, England, has applied for membership on the Rubber Exchange of New York, Inc.

Consulting Rubber Technologist
PRACTICAL
Twenty years' experience with the largest and most successful companies in the country
Physical and Chemical Testing
Special facilities for abrasion and quick age tests
Expert Advice to Correct Factory Trouble
New Processes and Formulas Developed
R. R. Olin Laboratories
P. O. Box 372, AKRON, OHIO
Telephones: Barberton 628, Portage 5895W

## RUBBER-INSULATEDMAN ACTS AS GOLD DIVINER

After he had been an invalid for 20 years, it was found that Frederick Stone, of Devonshire, England, needed insulation. He now wears thick rubber-soled boots and a vulcanite pad under the right foot and enjoys good health.

As an accompaniment to his recovered health through insulation, Mr. Stone has discovered that he now has powers of gold divining. He recently gave an exhibition of his ability at the Plymouth Museum and Art Gallery under the supervision of the curator, successfully locating several pieces of gold jewelry and four pieces of rough quartz which contained a small quantity of gold. In addition, he can find other minerals and springs of water.

### *Charles Coomer*

Charles Coomer, secretary of the General Rubber Company, Ltd., London office, died August 21 at the age of 53. He had been connected with that branch of the United States Rubber Company organization since August, 1906, two years after the General Rubber Company was organized.

Mr. Coomer was born in Liverpool and educated at the Liverpool Institute, the first five years of his business life being spent in that city. He was a well known figure in Mincing Lane rubber circles.

## COMMANDER BERNACCHI RETIRES AS DIRECTOR

Commander Louis Charles Bernacchi has announced his retirement from the board of the Property and General Finance Corporation, London. He is now mainly interested in rubber planting and is on the boards of six companies, but previously he gained considerable renown as an explorer.

Commander Bernacchi was born in Tasmania and started Antarctic exploration when he was twenty-two years of age. He was a member of the Southern Cross expedition and was later physicist with the Discovery expedition to the Antarctic. Unlike many polar explorers he has not, however, confined his attention to the ice regions. He has also made explorations in the tropics and undertook one notable journey through the primeval forests of Peru. He has published numerous works on the scientific results of his journeys. After exploration he took up politics in England and contested Widnes and Chatham in the Liberal interest. Both times he was unsuccessful. He is also a keen yachtsman, and an expert fencer.

## SYNTHETIC RUBBER IS SIMPLIFIED BY GERMANS

It has recently been discovered that the production of substances resembling latex can be simplified to an appreciable extent, and a method of operation has been developed which enables synthetic rubber latex to be produced in the minimum of time at ordinary or only moderately elevated temperatures. This enables polymerization products to be generated in a continuous and simple manner, since a liquid and easily manipulated reaction product is first obtained which can be transformed into rubber-like products of excellent properties by coagulation in any known manner, as for example, with acetic acid.

The resulting latex-like products may be worked up in the same way as latex—by coagulation, rolling, vulcanizing, etc. This simplification and discovery of method of operation is the result of much research work by the experts of the German Dye Trust at Frankfort-a-M., and the commercial application of these discoveries will be dependent on the price of natural rubber, the latter being at present much cheaper.

The following examples will serve to illustrate how the discovery and invention may be carried into practical effect:

If 400 parts by volume of butadiene, 15 parts of ammonium linoleate, 5 parts of ammonium oleate, 10 parts of sodium carbonate, 2 parts of disodium phosphate, 10 parts by volume of a 30 per cent solution of hydrogen peroxide, 75 parts of 5 per cent solution of glue, and 450 parts by volume of water are emulsified in a pressure vessel, and are then warmed at 30 per cent to 40 per cent C. for 12 hours a liquid resembling latex is obtained which furnishes, on coagulation, a polymerized product possessing plastic and elastic properties.

A mixture of 100 parts of isoprene and 75 parts of butadiene is emulsified in 500 parts of water with the addition of 15 parts of Turkey-red oil and 15 parts of trisodium phosphate; after standing for about 190 hours at room temperature a viscous, perfectly homogeneous liquid similar to latex will have formed, and on coagulation with acetic acid, furnishes an excellent and readily vulcanizable product of latex character.

CATALPO
for
Cushion Stocks

# *Names in the News*

F. A. SEIBERLING, president of the Seiberling Rubber Company and of the Rubber Manufacturers' Association; EDGAR B. DAVIS, prominent stockholder in the Goodyear Tire & Rubber Company and the United States Rubber Company; and WALTER B. MAHONY, a director of the Goodyear company and publisher of the *North American Review*, sailed together September 12 on the *Bremen* for a short business and pleasure trip to England and the Continent.

P. W. LITCHFIELD, president of the Goodyear Tire & Rubber Company, left Akron on September 5 to start on a trip to South America. He will make a tour of inspection of the Buenos Aires vicinity in connection with the intention of the company to purchase a site there for a tire and rubber goods factory.

WARD T. VAN ORMAN, winner five times in national balloon races and twice in international competition, has been selected as director of the ground school of the Goodyear-Zeppelin Corporation. Under his direction, students will be trained in ballooning, airship handling, meteorology, radio and navigational work.

THOMAS A. EDISON has recovered from his recent illness and is once more devoting the major part of his time to experiments with rubber bearing plants that will grow on American soil.

DR. H. N. WHITFORD, manager of the crude rubber department of the Rubber Manufacturers' Association, has returned to the association offices in New York City after a year spent in the Middle East investigating crude rubber conditions.

JOSEPH F. O'SHAUGNESSY has been appointed as an assistant to L. D. TOMKINS, general manager of the tire department of the United States Rubber Company. He was formerly director of sales for the Du Pont Viscoloid Company.

E. A. VAN VALKENBURG, well known rubber chemist, has joined the R. T. Vanderbilt Company in general rubber chemical sales and technology service.

NELSON MCLAUGHLIN has been appointed as editor of the *U. S. Tire Retailer*, a house organ of the United States Rubber Company. Mr. McLaughlin, a New York University man, has had several years of house organ and advertising agency experience.

L. M. SIMPSON, general sales manager of the tire department of the United States Rubber Company, visited Spokane, Wash., recently for a general business survey. He was accompanied by J. B. MAGEE, sales manager of the tire division in the Pacific area, and J. B. BRADY, Pacific Coast division manager. They were guests of L. E. CHALENOR, manager of sales in the Spokane division.

## MILLHOFF JOINS FALLS TO PROMOTE SALES WORK

F. C. Millhoff, former general sales manager of the Miller Rubber Company, has been appointed as assistant to W. P. Cline, president of the Falls Rubber Company, Cuyahoga Falls, O., in special charge of sales promotion work. He has already started upon the duties of his new position and is expected to spend much of his time in the field in contact with the dealer organization and the field sales force.

Mr. Millhoff, after serving as general sales manager of the Miller Rubber Company for 16 years and more recently as manager of the car and truck manufacturers' sales, announced his resignation on August 23, 1928. At that time he stated that he had made no plans for the immediate future other than to take a long rest.

**F. C. MILLHOFF**

Born in Akron on July 4, 1876, Mr. Millhoff has lived there practically all his life. His first work, after being graduated from the city's elementary and high schools, was in the tailoring trade from which he went to the English Woolen Mills and became manager of their plant at Louisville, Ky.

Returning to his native town, he opened a tailoring shop opposite the B. F. Goodrich factory, but became so impressed with the future of the rubber industry that he left his first trade to organize the M. & M. Manufacturing Company for the purpose of making cement and acids for rubber manufacturers. Officials of the Miller Rubber Company recognized his sales ability and in 1911 he accepted their offer of the position of sales manager in the tire department. For the next 17 years his advancement in the employ of the Miller organization was rapid.

A. T. MCGRATH, Boston branch manager of the Firestone Tire & Rubber Company, has announced the promotion to special sales work of G. L. MARGESON, who has been office manager at that branch. R. S. SKOOGLUND, who has been with the Firestone organization in New England for many years, has been named as office manager.

C. W. STANTON has been appointed New York district manager for the Republic Rubber Company, Youngstown, O., and will have his offices at 11 Park Place in that city. He will have charge of both railroad business and the general line of mechanicals in the metropolitan territory. Mr. Stanton started his career in the mill supply trade and entered the rubber business in 1916, representing the Boston Woven Hose & Rubber Company before joining the Republic organization.

C. W. SEIBERLING, vice-president of the Seiberling Rubber Company was confined to his bed early this month by a severe cold. It was thought for a time that he was on the verge of pneumonia, but his condition quickly improved.

JOHN W. THOMAS, vice-president of the Firestone Tire & Rubber Company, returned to Akron September 14 with Mrs. Thomas after a trip to England during which he inspected the new Firestone plant at Brentford, near London. They had left Akron on August 9.

CAPTAIN E. V. RICKENBACKER, vice-president of the Fokker Aircraft Corporation, flew from Detroit to Akron this month to confer with WILLIAM O'NEIL, president of the General Tire & Rubber Company.

F. B. DAVIS, JR., chairman of the board and president of the United States Rubber Company, sailed on the *Mauretania* early this month to spend a month looking over the company's interests in Europe.

J. D. TEW, president of the B. F. Goodrich Company, has filed his nominating petition for office as a member of the Hudson school district board of education. The Hudson district is a suburb of Akron, O.

N. L. KUEHN, of the N. L. Kuehn Company, Milwaukee, Wis., mechanical rubber goods manufacturer, traveled by airplane to Goshen, Ind., last month to attend the annual picnic of the Western Rubber Company of that city. Others who made the flight with Mr. Kuehn were George McCredie, assistant manager; Gilbert Retzlaff, secretary; and Harold Keuper, salesman.

R. J. FIRESTONE, president of the Standard Tire Company, Willoughby, O., returned to his office after a trip to Bridgeport, N. Y., where he aided the Bridgeport Bus Company to complete negotiations for taking over the franchise of another bus firm.

# Current Crude Rubber Items

## BUD GRAFTING IN RUBBER MAY DOUBLE ACRE YIELD

Bud grafting and other scientific methods applied to the rubber industry may eventually make it possible to produce 1,000 pounds or more of rubber per acre on scientifically developed plantations as against only 400 pounds per acre on ordinary plantations, according to an oral statement by chief of the rubber division, E. G. Holt, of the Department of Commerce, Sept. 7.

It was further stated that bud grafting, the taking of a shoot from a known high-producing mother tree and grafting it on to the stump of an ordinary young plant, has been the subject of much experimenting during the last 10 years, carried on chiefly by American owned rubber plantations of Sumatra. Most of the acreage planted with bud grafted trees is in the Netherland East Indies.

Bud grafting was not seriously practiced by the British rubber interests in Malaya and Ceylon during the period of restriction but has been given increased attention the past two years in these territories, following recommendations of the British undersecretary of state for the colonies, that increased attention to scientific developments on the part of British rubber producing companies was, in his opinion, essential to their maintaining their position in the rubber industry, it was stated.

Probably not more than 5 per cent of the rubber trees now planted in the Middle East are bud-grafted, and the expected high yields of these areas will only take effect as they gradually reach maturity, or six years after planting, it was further stated. Possibly 20 or 30 years hence a majority of the trees on rubber estates may be either bud-grafted or raised from selected seeds, but any such development would have to be gradual and the period of transformation would necessarily be a long one.

### Brokerage Firm Formed

Harry P. Schwarzman, formerly with P. P. Belford & Company. has announced that he will engage in the crude rubber brokerage business under the firm name of H. P. Schwarzman & Company. He has opened an office at 111 Broadway, New York City.

### Patents Reclaiming Process

A. W. Morton. Victoria, Australia, has patented a process of reconditioning old vulcanized rubber which consists of reducing the old rubber to a finely divided state, adding a quantity of sulfur thereto, treating the resultant and sulfur mixture with a small amount of liquid mixture of benzine, carbon bisulphide and carbon tetrachloride, and subsequently vulcanizing the mass so produced.

## GOVERNMENT STATISTICS REPORTED AS ACCURATE

The Rubber Division of the Department of Commerce has been asked on several occasions whether its invoice statistics cover all rubber shipped to the United States from the countries named. Investigation proves that the statistics cover all such shipments of crude rubber including dry weight of latex, according to E. G. Holt, chief of the Rubber Division.

Information from reporting officers shows that rubber shipped on optional B/L from the East to London or New York, and sold to American buyer en route, is not visaed by American consuls at Eastern ports, but papers are presented for American consular vise in England and statistics included with United Kingdom figures above. Through this practice Eastern shippers avoid paying consular vise charges unless the consignment ultimately goes to United States.

## NEW ESTIMATES OF DUTCH NATIVE RUBBER

The official estimate of Dutch rubber exports on a dry rubber basis during 1928 have been placed by authorities in the Netherlands East Indies at 90,962 metric tons. The total export of wet and dry native rubber were previously reported in the official trade returns as 128,276 metric tons (wet weight), of which 18,464 metric tons was dry rubber. The percentage reduction used on total wet weight of exports for 1928 therefore figures at 29 per cent in order to get the dry weight. If the native rubber exported in dry form is subtracted from the calculation, the percentage reduction on the wet rubber necessary to give total exports agreeing with the official estimate is 33.98 per cent.

The estimate, as reported by the U. S. Department of Commerce, is accompanied by a statement that the 1929 potential production is estimated at 135,000 metric tons and that at a price of one shilling per pound the population will tap as much as possible.

### Rubber Estate Amalgamation

The Sungei Krian Rubber Estates, Ltd., have purchased the Khay Hong estate, which adjoins their Somme estate. Khay Hong comprises approximately 568 acres of rubber, and the purchase price was reported as approximately $160,000.

PHILLIP P. BELFORD has retired as president of P. P. Belford & Company, rubber brokers, and has been succeeded by CHARLES H. MOORE in that capacity. LAWRENCE B. PROCTOR has joined the firm as general partner.

## *Closing Prices on Rubber Exchange of New York, Inc.*

FROM SEPTEMBER 5 TO SEPTEMBER 18, 1929

| | | Spot | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sales* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sept. | 5 | 19.70 | 19.70 | 20.00 | 20.40 | 20.80 | 20.90 | 21.10 | 21.40 | 21.50 | 21.70 | 21.90 | 22.10 | 22.30 | 198 |
| | 6 | 19.50 | 19.70 | 20.00 | 20.30 | 20.80 | 20.90 | 21.20 | 21.40 | 21.50 | 21.80 | 22.00 | 22.20 | 22.40 | 352 |
| | 7 | 19.70 | 19.70 | 20.00 | 20.40 | 20.90 | 21.00 | 21.20 | 21.40 | 21.60 | 21.80 | 22.00 | 22.10 | 22.30 | 40 |
| | 9 | 19.90 | 19.90 | 20.40 | 20.80 | 21.10 | 21.20 | 21.50 | 21.70 | 21.90 | 22.10 | 22.30 | 22.50 | 22.70 | 389 |
| | 10 | 20.30 | 20.30 | 20.70 | 21.00 | 21.30 | 21.50 | 21.70 | 21.90 | 22.10 | 22.30 | 22.50 | 22.70 | 22.90 | 864 |
| | 11 | 19.90 | 19.80 | 20.20 | 20.60 | 20.90 | 21.20 | 21.40 | 21.60 | 21.70 | 21.90 | 22.10 | 22.30 | 22.50 | 321 |
| | 12 | 20.00 | 19.90 | 20.30 | 20.70 | 21.20 | 21.40 | 21.60 | 21.80 | 22.00 | 22.20 | 22.30 | 22.50 | 21.00 | 183 |
| | 13 | 19.80 | 19.80 | 20.10 | 20.50 | 20.90 | 21.10 | 21.30 | 21.50 | 21.70 | 21.90 | 22.10 | 22.20 | 22.40 | 93 |
| | 14 | 19.90 | 19.90 | 20.20 | 20.60 | 21.00 | 21.20 | 21.40 | 21.60 | 21.80 | 22.00 | 22.20 | 22.30 | 22.50 | 62 |
| | 16 | 19.90 | 19.90 | 20.40 | 20.80 | 21.10 | 21.30 | 21.50 | 21.70 | 21.90 | 22.00 | 22.30 | 22.50 | 22.70 | 96 |
| | 17 | 20.10 | 20.10 | 20.40 | 20.80 | 21.30 | 21.40 | 21.70 | 21.90 | 22.00 | 22.20 | 22.40 | 22.60 | 22.80 | 365 |
| | 18 | 19.90 | 19.80 | 20.10 | 20.50 | 21.00 | 21.10 | 21.30 | 21.60 | 21.70 | 21.80 | 22.10 | 22.30 | 22.50 | 332 |

*In lots of 2½ tons each

**CATALPO**

**for**

**Inner Tubes**

**INTERNATIONAL PULP CO., *41 Park Row, New York, N. Y.***

SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER

Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.

LIBERAL WORKING SAMPLE FURNISHED FREE

# *Rubber Goods and Specialties*

## India Whitewall Tire

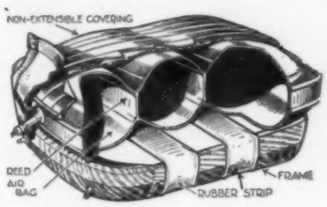
The India Tire & Rubber Company, Akron, O., has announced its introduction of a super service white sidewall tire, presenting a striking contrast in black and white with no intervening red stripe. According to the manufacturer, the India Whitewall tire does not become brown or pink as some white sidewall tires have been known to do after

a period of service. This tire retains its natural color, and at the most, after long exposure will not turn more than an ivory cast.

## Automotive Ignition Cable

Lacquered ignition cable has been added by the General Electric Company, Bridgeport, Conn., to its line of automotive electrical products. This cable is sold in a series of sets that will fit any car. The cables in each set are equipped with both

thrust and snap terminals so that they will fit every spark plug. The textolite caps, sold with each set to protect spark plug and distributor terminals, are made of a hard, high-gloss compound. This cable is also sold on spools for those who need it in larger quantity.




## Motor Car Cushions

A pneumatic cushion for motor car upholstery that maintains uniform air pressure throughout all its sections despite the load put upon it is being marketed by Paxon, Ltd., 186 Blythe Road, London, England. The external appearance of the cushion is the same as that of the ordinary sprung type. This external covering, which is of leather or a similar non-extensible material, houses a pneumatic cushion which is divided into three compartments by two non-extensible ribs or reeds. The air pocket is carried in a bottomless frame, the inner sides of which taper at an angle of 45 degrees. Across this is stretched two 3-inch wide rubber strips which give to a certain extent to the load, but the spaces between allow for the cushion to expand.

## Pneumatic Decoys

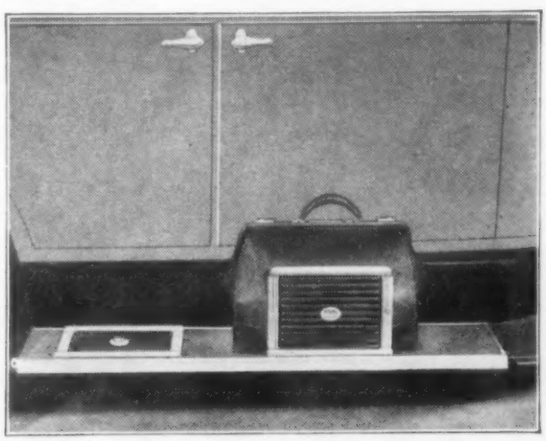
Said to be the lightest decoys in the world, these Stoner water ballast pneumatic decoys are being manufactured and distributed by the Eno Rubber Corporation, 110 East 17th Street, Los Angeles, Cal. These decoys are made from pure Para gum, the walls being made of two sheets, calendered one sixty-fourth of an inch thick, laminated to make one thirty-second of an inch. They are hand plied in the raw and cured after construction by a long-life cure process, said to make a perfect union of seams. The body is made of four pieces and the tail made separately and attached by rubber cement. The colors act as a preservative to the rubber, according to the manufacturer, and will

not shine in the sun. The decoys can be inflated to any size desired and the riding depth can be regulated by the amount of water ballast. They are packed eight drakes and four hens to a box in a variety of models.

## Overman Patents Upheld

The Goodyear Tire & Rubber Company has infringed patents owned by the Overman Cushion Tire Company, Belleville, N. J., for the manufacture of cushioned truck tires, Judge T. D. Thatcher ruled in a federal court decision this month. The Goodyear company's pneumatic cushion tire and its super-pneumatic cushion tire were both found to infringe the Overman patent.

## Red Cap Step Plate Luggage Carrier



Under the name of the Red Cap step plate luggage carrier, the Wahl Company, 1800 Roscoe Street, Chicago, Ill., is manufacturing a running board step plate that is hinged on its outer side so that it may be raised to act as a luggage carrier. Ordinarily this new accessory is a step plate of usual appearance, with heavy rubber ridges to grip the sole and a highly polished aluminum frame confining the rubber. The outer edge, which has a square upstanding ridge upon which to scrape mud off one's shoes, contains a strong spring, and raising the inner edge of the step plate swings it to an upright position on the outer edge of the running board, to which it is bolted with two hinges. To prevent slipping and chafing, the under side is covered with thick, soft rubber, moulded into 600 diamond shaped depressions which give a vacuum cup gripping effect.

## TO HOLD EXAMINATIONS FOR U. S. TECHNOLOGISTS

The United States Civil Service Commission has announced that open competitive examinations will be held for the position of associate technologist, paying $3,200 a year, and assistant technologist, paying $2,600 a year. The examinations are to fill vacancies in the Government Printing Office and the Bureau of Standards, and optional subjects specified are rubber technology, leather technology, paper technology, ceramics, chemical technology and other special branches of technology.

Applications must be on file not later than October 9. Competitors will not be required to report for examination at any place, but will be rated on their education, training, experience and writings. Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or from the secretary of the United States Civil Service Board of Examiners at the post office or custom house in any city.

## Goodyear Entertains Turks

The four members of the Turkish aeronautical mission which are visiting the United States were entertained as guests of Goodyear-Zeppelin Corporation at Akron recently, following the Cleveland Air Show.

Members of the party are Ahmed Emin Bey, Major Shefik Bey, First Lieut. Kiazim Bey, and Mouhlis Bey. They will be accompanied to Akron by three representatives of the Curtiss Airplane Export Co., Commander Roland Riggs, Harold D. Kantner and Miss Helen L. Weber, their secretary.

**The Philadelphia Rubber Works Company**

Manufacturer of

**RECLAIMED RUBBER**

of

**STANDARDIZED QUALITY**

NEW YORK
52 Vanderbilt Ave.

AKRON, OHIO

OAKS, PA.
(Montgomery County)

## CLASSIFIED ADVERTISING

Five cents a word, minimum charge $2.00, payable in advance.
Address replies to Box Numbers
THE RUBBER AGE
250 West 57th St., New York City

### SITUATIONS WANTED

AMERICAN of long experience and acclimated in tropics desires executive position. Successful in handling Indians, blacks, and other native labor, skilled in camp sanitation, difficult transportation problems, and general management. Will accept assignment to investigate new regions, making reconnoitre survey, photographs, and comprehensive business report, with view to permanent position. Former federal investigator, highest references. Address Box 534, THE RUBBER AGE.

AMERICAN, former Chief Chemist large Canadian tire plant, with eleven years' experience, nine years with two large firms in Akron, Ohio, wishes to communicate with rubber firm having opening in executive personnel. Thoroughly conversant with most modern developments of straight line methods of tire and tube production. Address Box 533, THE RUBBER AGE.

### HELP WANTED

WANTED: Chemist, experienced, to take charge of compounding for mechanical goods and specification work by factory located in East. A good opportunity for the right man. In replying state age and give full particulars on past experience and present salary. Address Box 535, THE RUBBER AGE.

### FOR SALE

FOR SALE: One Kane 6 HP Steam Boiler and Three Vulcanizing Presses; one single, two double, all like new. Also offset plates for tumbling barrel and moulds. Address Box 10X, Flatbush Observer, 1518 Flatbush Ave., Brooklyn, N. Y.

### BUSINESS OPPORTUNITIES

An experienced, dependable broker will aid in financing propositions of merit. Amster Leonard, East Orange, N. J.

**CATALPO**

**for**

**Treads**

FLUXRITE

PRACTICAL SOFTENERS

INVESTIGATIONS INVITED

*You Cannot Afford to Be Without Them*

DAMASCUS MANUFACTURING CORP.

CLEVELAND, OHIO

NEW JERSEY TERRITORY: H. M. Royal, Inc., Trenton

EMBOSSING CALENDERS

For Artificial Leather, Oil Cloth, Carriage and Automobile Covers

DRYING MACHINES

with Copper or tinned iron Cylinders for Cotton Ducks, Drills and Sheetings

The Textile-Finishing Machinery Co.

OFFICE, No. 83 EXCHANGE PLACE

PROVIDENCE, R. I.

The Franz Foundry & Machine Co.

AKRON, OHIO

Mold Equipment
Retread Equipment
Engraving Machines
India Core and Chucks
India Self-Acting Drums
Watchcase Vulcanizers
General Machine Work

WHITTAKER

ESTABLISHED 1890

*Standard for 39 years*

MINERALS-COLORS
CHEMICALS

Whittaker, Clark & Daniels, Inc.

IMPORTERS—MANUFACTURERS—EXPORTERS

245 FRONT ST. NEW YORK CITY

SCOTT TESTERS

Simple enough to be practical. Free from complications and adjustments. Substantial and durable. As well as accurate, easy to read and easy to operate, Scott Testing Machines meet commercial requirements and conditions without sacrificing scientific exactness.

HENRY L. SCOTT COMPANY

PROVIDENCE, R.I.

*The*

GENERAL

TIRE

*—goes a long way to make friends*

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

# LATE MARKET PRICES

## Crude, Scrap & Reclaimed Rubber - Cottons and Fabrics

**NEW YORK, SEPTEMBER 18, 1929**

## COTTON

DESPITE the fact that the Crop Reporting Bureau of the Department of Agriculture has placed the condition of the crop as of September 1st at 55.4 per cent and the probable production at 14,825,000 bales, compared with its previous estimate of 15,543,000 bales, the market has slumped considerably during the fortnight. The spot price quotation for middling upland cotton was 18.60 cents a pound on September 18, as compared to 19.55 cents on September 3.

This drop of practically a cent a pound has been due largely to the belief that recent rains in the cotton belt will bring about a material increase in the size of the crop. Other opinion, however, holds to a belief that the rains came too late to be of great benefit, although it may prevent premature opening in some sections.

The Cotton Textile Institute has placed August production at 8 per cent over July and sales 101.7 per cent of that increased production, reducing stocks of goods on hand. Trade conditions, therefore, are improving.

High, low and closing prices quoted on September 18 were as follows:

| | High | Low Sept. 18 | Close | Close Sept. 4 |
|---|---|---|---|---|
| Sept. | —— | —— | 18.38 | 18.99 |
| Oct. | 18.57 | 18.43 | 18.42 | 18.97 |
| Nov. | —— | —— | 18.59 | 19.21 |
| Dec. | 18.92 | 18.76 | 18.78 | 19.39 |

## Tire Fabrics

Statistics compiled by the Rubber Manufacturers Association show that the tire industry in the United States consumed 24,167,681 pounds of cotton fabric during the month of July and 195,867,450 pounds during the first seven months of the year. This compares with a consumption of 20,947,405 pounds in July, 1928, and 129,888,546 pounds in the first seven months of 1928. Late price quotations were as follows:

| | | | | |
|---|---|---|---|---|
| **CORD** | | | | |
| Peeler, carded, 23/5/3 | lb | .47 | @ | .48 |
| Peeler, carded, 23/4/3 | lb | .48 | @ | .49 |
| Peeler, carded, 13/3/3 | lb | .44½ | @ | .45½ |
| Peeler, carded, 15/3/3 | lb | .45 | @ | .46 |
| Egyptian, carded, 23/5/3 | lb | .53½ | @ | .54 |
| Egyptian, combed, 23/5/3 | lb. | .57½ | @ | .58 |
| **CHAFERS** | | | | |
| Carded, American, 8 oz. | lb | .40 | @ | .41 |
| Carded, American, 10 oz. | lb | .40½ | @ | .41½ |
| Carded, American, 12 oz. | lb | .40½ | @ | .42½ |
| Carded, American, 14 oz. | lb | .39 | @ | .45 |
| **LENO BREAKER** | | | | |
| Carded, American, 8¼ oz. | lb. | .40 | @ | .46 |
| Carded, American, 10¼ oz. | lb. | .40 | @ | .46 |
| **SQUARE WOVEN** | | | | |
| Carded, American, 17¼ oz. 23-11 ply | lb. | .47 | @ | .48 |
| Carded, American, 17¼ oz. 10-ply | lb | .39 | @ | .40 |

## Sheetings

Latest prices of sheetings, as reported by the Textile Brokers Association, Inc., on September 18 were as follows:

| | | | | |
|---|---|---|---|---|
| 40-inch, 2.50-yard | yd. | — | @ | .12½ |
| 40-inch, 2.85-yard | yd. | — | @ | .11⅞ |
| 40-inch, 3.15-yard | yd. | — | @ | .11 |
| 40-inch, 3.60-yard | yd. | — | @ | .09½ |
| 40-inch, 3.75-yard | yd. | — | @ | .09¼ |
| 40-inch, 4.25-yard | yd. | — | @ | .08 |

## Ducks

Interest was reported in double filled enameling and single filling grade A ducks in the New York market as the fortnight closed. A firmer tendency was noted in hose and belting ducks, with some quoting 35½ cents to 36½ cents, although 35 cents was reported still possible on some grades for quantity. Numbered ducks were unchanged and selling lightly. Late prices follow:

| | | | | |
|---|---|---|---|---|
| Belting and Hose | lb. | .35 | @ | .36½ |
| Enameling | lb. | .31 | @ | .36 |
| Single filling | lb. | .14½ | @ | .16 |
| Double filling | lb. | — | @ | .18 |

## RECLAIMED RUBBER

According to the figures compiled by the Rubber Manufacturers Association, brought up to a 100 per cent basis, the production of reclaimed rubber in the United States during August was 19,787 long tons and the amount consumed was 18,230 long tons. Stocks on August 31 were, therefore, somewhat higher at 22,309 long tons, but this fact has not caused any noticeable fluctuation in price quotations. Latest prices reported at the end of the fortnight were as follows:

| | | | | |
|---|---|---|---|---|
| ***High Tensile*** | | | | |
| Super-Reclaim No. 1 Black | lb. | .12¼ | @ | .12½ |
| Super-Reclaim No. 2 Black | lb. | .11 | @ | .11½ |
| High Tensile Red | lb. | .12 | @ | .12¼ |
| ***Shoe*** | | | | |
| Unwashed | lb. | .07 | @ | .07¼ |
| Washed | lb. | .09¾ | @ | .10 |
| ***Tube*** | | | | |
| No. 1 (Floating) | lb. | .13 | @ | .13½ |
| No. 2 (compounded) | lb. | .09¾ | @ | .10 |
| ***Tires*** | | | | |
| Black | lb. | .07¼ | @ | .07½ |
| Black, selected tires | lb. | .07½ | @ | .07¾ |
| Dark Gray | lb. | .09½ | @ | .10 |
| Light Gray | lb. | .11½ | @ | .12 |
| White | lb. | .12 | @ | .12½ |
| Truck, Heavy Gravity | lb. | 07 | @ | .07¼ |
| Truck, Light Gravity | lb. | .07¼ | @ | .07½ |
| ***Miscellaneous*** | | | | |
| Mechanical Blends | lb | .06½ | @ | .07 |
| Red | lb. | .12 | @ | .12¼ |

## Scrap Rubber

Little change is to be noticed on the various grades of rubber scrap, with demand continuing firm from reclaiming plants. Latest price quotations were as follows:

(Prices to Consumer)

| | | | |
|---|---|---|---|
| Auto tire peelings | ton | 42.50 | @45.00 |
| Standard White auto | ton | 47.50 | @50.00 |
| Mixed auto | ton | 26.50 | @27.50 |
| Bicycle tires | ton | 20.00 | @22.50 |
| Clean solid truck tires | ton | 24.00 | @25.00 |
| Boots and shoes | cwt. | 1.45 | @ 1.50 |
| Arctics, untrimmed | lb. | .00⅞ | @ .01 |
| Inner tubes, No. 1 | lb. | .08 | @ .08¼ |
| Inner tubes, No. 2, compounded | lb. | .04½ | @ .04⅝ |
| Inner Tubes, Red | lb. | .05¼ | @ .05⅝ |
| Air Brake Hose | ton | 32.00 | @34.00 |
| Rubber Hose | ton | 17.50 | @20.00 |

## CRUDE RUBBER

ACCORDING to the monthly statistics compiled by the Rubber Manufacturers Assn., there were 503,192 tons of crude rubber consumed in the domestic industry during the year ended July 31, 1929. This is the greatest twelve-month period that the industry has ever experienced, and a letdown in factory production schedules at the present time is only natural in the general course of events.

The greatest twelve months for tire manufacturers have been in the year ended June 30, 1929, rather than the period mentioned above. From the first of July, 1928, to the last of June of this year, 84,260,830 pneumatic casings of all types were turned out by American factories. It is little wonder, therefore, that tire production in July of this year declined below the figure for July, 1928, in order to cut down the rapidly accumulating inventories that had reached record proportions in the hands of manufacturers.

The market price of crude rubber has ended the fortnight practically at the same level at which it began, but quotations during the period have been lower. The heavy shipments from Malaya, the gains in London stocks, and the recent jump in the amount of rubber invoiced to the United States have all had their effect on the price of the commodity.

Hedge selling helped to hold prices down as the fortnight closed. The market for actuals had softened considerably, and the outlook was not so bright as some interests might desire.

Prices quoted on the New York outside market on September 18 were as follows:

| | | | |
|---|---|---|---|
| ***Plantations—*** | | | |
| Ribbed Smoked Sheets— | | | |
| Spot-Sept. | .20¼ | @ | .20½ |
| Oct.-Dec. | .20¾ | @ | .21 |
| Jan.-Mar. | .21¼ | @ | .21½ |
| First Latex, crepe spot | .21¼ | @ | .21½ |
| Amber Crepe, No. 2 | .17½ | @ | .17¾ |
| Amber Crepe, No. 3 | .17¼ | @ | .17½ |
| Amber Crepe, No. 4 | .17 | @ | .17¼ |
| Brown Crepe, Clean thin | .17¼ | @ | .17½ |
| Brown Crepe, specky | .17 | @ | .17¼ |
| Liquid Latex, per gal. | 1.00 | | |
| ***Paras—*** | | | |
| Up-river Fine | .21 | @ | .21¼ |
| Up-river Medium | Nominal | | |
| Up-river Coarse | .11½ | @ | |
| Acre Bolivian, fine | .21 | @ | .21½ |
| Caucho Ball, Upper | .11½ | @ | |
| Islands, fine | Nominal | | |
| ***Centrals—*** | | | |
| Central, scrap | .11½ | @ | .12 |
| Esmeraldas | .11½ | @ | .12 |
| ***Balata—*** | | | |
| Block, Colombia | Nominal | | |
| Block, Ciudad | .54 | @ | |

### LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers

| | | | |
|---|---|---|---|
| Spot-Sept. | | @ | 10¼d |
| Oct.-Dec. | 10⅝d | @ | 10½d |

### SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers

| | | | |
|---|---|---|---|
| Spot | 9⅝d | @ | 9¾d |

## For Rubber Compounding

C. K. WILLIAMS & CO. ANCHOR BRAND DRY COLORS AND FILLERS EASTON, PA. U.S.A.

IRON OXIDES

Asbestine
Barytes
Soapstone
Talc

**C. K. WILLIAMS & CO.**
EASTON, PA.

SINCE 1880 GUARANTEED

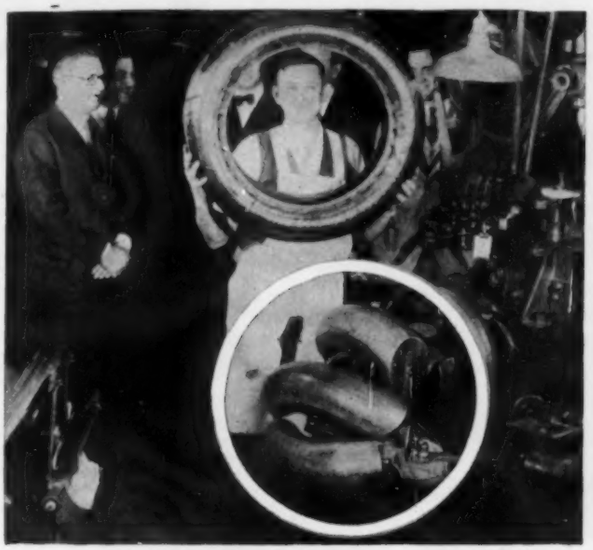
**Rand** RUBBER GOODS

| | |
|---|---|
| Dress Shields | Pure Rubber Sheets |
| Rubber Sheetings | Rubber Bibs |
| Bunny Baby Pants | Crib Sheets |
| Sanitary Requisites | Bathing Caps |
| Guimps & Brassieres | Rubber Specialties |
| Randprint Aprons | Powder Puff Pockets |
| All Styles Rubber Aprons | Randprint Rubber |

SHEET GUM cut to pattern for manufacturers

*"They Last Longer"*

Made by
**RAND RUBBER COMPANY, Inc.**
Formerly Brooklyn Shield & Rubber Co., BROOKLYN, N. Y.



# All STEEL Core

LIGHT WEIGHT

*for large size tires*

COLLAPSIBLE OR RING TYPE

**THE INDIA MACHINE & RUBBER MOLD CO.**

Annadale Ave. Akron, Ohio

## REVUE GÉNÉRALE DU CAOUTCHOUC

A monthly review edited by the Rubber Association, 18 rue Duphot, Paris (1er)

*Only officially accredited publication in France*

CONTAINS ORIGINAL CONTRIBUTIONS FROM FRENCH TECHNOLOGISTS. TECHNICAL AND COMMERCIAL INFORMATION, NEWS OF THE RUBBER TRADE.

Price of annual subscription: 80 Frs.

*Specimen copy sent free on request*

■ ■ ■

All Rubber Technologists should read:

THE ENCYCLOPAEDIA of the RUBBER AND ALLIED INDUSTRIES

25 collaborators—500 pages—300 illustrations. Edited by the Rubber (and allied industries) Association, 18 rue Duphot, Paris (1er)—Preface by M. Ch. Jung, President of the Association, Member of the Chamber of Commerce.

Price: 125 Francs ($5.00)

*The Unexcelled Softener*

ARLINGTON MILLS

**DEGRAS**

PURE WOOL GREASE

The Ideal Emollient for overcoming the surface tension of carbon black and effecting its complete and rapid dispersion in the rubber stock.

**W. L. Montgomery & Co.**
Sole Selling Agents
10 HIGH ST. BOSTON, MASS.

*The* CARTER BELL MFG CO

CARTER BELL STANDARD SINCE 1903 RUBBER SUBSTITUTES

150 Nassau Street New York

# LATE RUBBER CHEMICAL PRICES

## Accelerators — Colors — Softeners — Compounding Materials

**NEW YORK, SEPTEMBER 18, 1929**

PRICE quotations on rubber chemicals and compounding ingredients have remained steady thus far in September, with output by the leading suppliers being curtailed to a certain extent in view of the slackening up of production at rubber factories. No indication of any general price movement has yet become apparent, and it is believed that the balance between supply and demand is being well maintained by the makers of chemicals and compounding materials for use in the rubber industry.

Although the domestic industry may lower its volume of output during the last three months of the year, it still is certain that 1929 will stand out as the greatest twelve month period ever recorded in the history of rubber manufacturing. Chemical suppliers have had their share of the industry's prosperity and are looking forward to 1930 being at least equally profitable.

### ACCELERATORS

| Organic | | | | |
|---|---|---|---|---|
| A-7 | lb. | .55 | @ | .59 |
| A-11 | lb. | .62 | @ | .66 |
| A-16 | lb. | .57 | @ | .61 |
| A-19 | lb. | .58 | @ | .62 |
| A-20 | lb. | .64 | @ | .68 |
| Accelerator 102 | lb. | | | |
| Accelerator 552 | lb. | | | |
| Accelerator 808 | lb. | | | |
| Accelerator 883 | lb. | | | |
| Aldehyde ammonia, crystals | lb. | .65 | @ | .70 |
| Aniline oil, drums, f.o.b. works | lb. | .15 | @ | .16¼ |
| Crylene | lb. | .55 | @ | .65 |
| paste | lb. | .45 | @ | .55 |
| Di-Ortho-Tolyguanidine | lb. | .42 | @ | .52 |
| Diphenylguanidine | lb. | .30 | @ | .36 |
| Ethylidene anilene | lb. | .45 | @ | .47½ |
| Formaldehyde aniline | lb. | .34 | @ | .44 |
| Heptene | lb. | .40 | @ | — |
| Hexamethylene-tetramine | lb. | .58½ | @ | .61 |
| Lithex | lb. | .18 | @ | .20 |
| Methylenedianiline | lb. | .37½ | @ | .40 |
| Monex | lb. | 3.25 | @ | — |
| Oxynone | lb. | .68 | @ | .80 |
| Para-Nitrosodimethylaniline, f.o.b. works | lb. | .92 | @ | .96 |
| Piperidine-Piperidyldithio-Carbamate | lb. | 4.45 | @ | 4.60 |
| R & H 49 | lb. | .40 | @ | .42½ |
| R & H 50 | lb. | .40 | @ | .42½ |
| R & H 397 | lb. | .75 | @ | .77½ |
| Safex | lb. | 1.20 | @ | 1.25 |
| Tensilac, No. 39 | lb. | .40 | @ | .42½ |
| Tensilac, No. 41 | lb. | .50 | @ | .52½ |
| Thermic F | lb. | .50 | @ | .55 |
| Thiocarbanilide, drums | lb. | .25½ | @ | .28½ |
| Thionex | lb. | | | |
| Trimene | lb. | .75 | @ | — |
| base | lb. | 1.20 | @ | — |
| Triphenylguanidine | lb. | .58 | @ | .62½ |
| Ureka | lb. | .75 | @ | 1.00 |
| Vulcanex | lb. | | | |
| Vulcone | lb. | | | |
| Vulcanol | lb. | | | |
| Waxene | lb. | .30 | @ | .32 |
| Z 88 | lb. | .50 | @ | .60 |
| Inorganic | | | | |
| Lead, sublimed blue | lb. | .08¼ | @ | — |
| Lead, white | lb. | .10½ | @ | .12½ |
| Litharge, domestic | lb. | .09 | @ | — |
| Magnesia, calcined, light | per 100 lb. | 5.25 | @ | 5.45 |
| heavy | per 100 lb. | 3.65 | @ | 3.75 |

### COLORS

| Blacks (See Compounding Materials) | | | | |
|---|---|---|---|---|
| **Blues** | | | | |
| Prussian | lb. | .35 | @ | .40 |
| Ultramarine | lb. | .06 | @ | .30 |
| **Browns** | | | | |
| Sienna, Italian | lb. | .05½ | @ | .12½ |
| Umber, Turkey | lb. | .04½ | @ | .07 |
| **Greens** | | | | |
| Chrome, light | lb. | .27 | @ | .31 |
| medium | lb. | .29 | @ | .31 |
| dark | lb. | .31 | @ | .34 |
| Chromium Oxide, bbl. | lb. | .31 | @ | .38 |
| **Reds** | | | | |
| Antimony crimson, 15/17 | lb. | .44 | @ | .50 |
| sulfur free | lb. | .52 | @ | .60 |
| golden 15/17 F.S. | lb. | .20 | @ | .25 |
| Indian English | lb. | .08 | @ | .12 |
| Domestic (Maroon) | lb. | .08 | @ | .12 |
| Oximony | lb. | .12¼ | @ | — |
| Red oxide, pure | lb. | .10 | @ | .12 |
| Venetian red | lb. | .03 | @ | .06 |
| Vermillion, quicksilver, English | lb. | 1.95 | @ | — |
| **Whites** | | | | |
| Lithopone, Akcolith | lb. | .05 3/5 | @ | .06 |
| Lithopone, Azolith | lb. | .05¼ | @ | .05¾ |
| Lithopone, Vanolith | lb. | .05¾ | @ | — |
| Titanox, f.o.b. St. Louis | lb. | .08½ | @ | .09 |
| Titanium Calcium Pigment, f.o.b. St. Louis | lb. | .08 | @ | .08½ |
| Zinc Oxide—American Process | | | | |
| American Azo: | | | | |
| ZZZ (lead free) | lb. | .06½ | @ | .07 |
| ZZ (leaded) | lb. | .06⅝ | @ | .06⅞ |
| Zinc Oxide—French Process | | | | |
| White seal | lb. | .11⅜ | @ | — |
| Green seal | lb. | .10⅞ | @ | — |
| Red Seal | | .09⅝ | @ | — |
| **Yellows** | | | | |
| Chrome | lb. | .16½ | @ | .17 |
| Ocher, French medium | lb. | .02 | @ | .03 |
| domestic | lb. | .01⅝ | @ | .02 |

### COMPOUNDING MATERIALS

| | | | | |
|---|---|---|---|---|
| Aluminum Flake | ton | 21.85 | @ | 24.50 |
| Ammonia carbonate | lb. | .10½ | @ | .12 |
| Asbestine | ton | 14.75 | @ | 18.00 |
| Barium carbonate | lb. | .03½ | @ | .05 |
| Barium Dust | lb. | .05 | @ | .06 |
| Barytes southern off-color | ton | 12.00 | @ | 18.00 |
| Western prime white | ton | 23.00 | @ | — |
| imported | ton | 27.00 | @ | 36.00 |
| Basofor | lb. | .04½ | @ | — |
| **Blacks** | | | | |
| Arrow "Aerfloted" | lb. | .07 | @ | .12 |
| Bone Black | lb. | .07 | @ | .08½ |
| Carbon, compressed | lb. | .06½ | @ | .12 |
| Carbon, uncompressed | lb. | .06½ | @ | .11 |
| Disperso | lb. | .11 | @ | |
| Drop Black | lb. | .06 | @ | .10 |
| Fumonex | lb. | .06 | @ | .09 |
| Gastex | lb. | .04½ | @ | .08 |
| Lamp Black | lb. | .12 | @ | .40 |
| Micronex | lb. | .07 | @ | .12 |
| Velvetex carbon | lb. | .04½ | @ | .06 |
| Blanc fixe dry f.o.b. works | lb. | .03½ | @ | .03¾ |
| Carrara filler | lb. | .01¾ | @ | .02 |
| Catalpo (fact.) | lb. | .02 | @ | — |
| Clay, China, domestic | ton | 8.00 | @ | 9.00 |
| Aerfloted Suprex | ton | 10.00 | @ | 22.00 |
| Congaree, c. l. f.o.b. mine | ton | 9.00 | @ | — |
| Lexington | ton | 10.00 | @ | 22.00 |
| Mineral Flour, c. l. fob mine | ton | 20.00 | @ | 23.00 |
| Tensulite | | 15.00 | @ | — |
| Glues, extra white | lb. | .22 | @ | .26 |
| medium white | lb. | .20 | @ | .24 |
| Magnesia, carbonate | lb. | .07 | @ | .09 |
| Mica (muscovite) 160 mesh White, water grnd., c.l. | lb. | .06 | @ | — |
| White, water grnd., ton lots, whse. | lb. | .07 | @ | — |
| White, water grnd., less ton lots, whse. | lb. | .08 | @ | — |
| Off color (biotite) | lb. | .05 | @ | .07 |
| Rotten Stone (powdered) | lb. | .02½ | @ | .04½ |
| Soapstone, powdered | ton | 15.00 | @ | 22.00 |
| Starch, powdered | cwt. | 3.30 | @ | 3.70 |
| Talc, domestic | ton | 12.00 | @ | 15.00 |
| Whiting, commercial | cwt. | .85 | @ | 1.00 |
| English cliffstone | cwt. | 1.75 | @ | 2.00 |
| Superfine | ton | 10.00 | @ | 12.00 |
| Witco | ton | 12.00 | @ | — |
| Wood pulp XXX | ton | 45.00 | @ | — |
| Wood pulp X | ton | 25.00 | @ | — |
| Zinc Carbonate | lb. | .09¼ | @ | .10½ |
| Zinc Stearate | lb. | .23½ | @ | .25 |

### MINERAL RUBBER

| | | | | |
|---|---|---|---|---|
| Genasco (factory) | ton | 50.00 | @ | 52.00 |
| Montezuma, solid | ton | 28.00 | @ | 36.00 |
| Montezuma, granulated | ton | 32.00 | @ | 42.00 |
| Paradura | ton | 62.50 | @ | 65.00 |
| Pioneer, MR, solid | ton | 42.00 | @ | 45.00 |
| Pioneer-granulated | ton | 52.00 | @ | 55.00 |
| R & H Hydro-Carbon | ton | 27.05 | @ | 29.00 |
| Robertson, MR, solid | ton | 34.00 | @ | 80.00 |
| M.R. (gran) | ton | 38.00 | @ | 80.00 |

### SOFTENERS

| Acids | | | | |
|---|---|---|---|---|
| Nitric, 36 degrees | cwt. | 5.00 | @ | 5.25 |
| Sulfuric, 60 degrees | ton | 10.50 | @ | 11.50 |
| 66 degrees | ton | 15.00 | @ | 16.00 |
| Tartaric, crystals | lb. | .37 | @ | .38 |
| Acids, Fatty | | | | |
| Stearex | lb. | .15 | @ | .19 |
| Stearic, double pressed | lb. | .17 | @ | .22 |
| **Alkalies** | | | | |
| Caustic soda, 76% | cwt. | 3.76 | @ | 3.91 |
| Soda ash, 58% C.L. | cwt. | 1.40 | @ | |
| **Oils** | | | | |
| Corn, refined, bbls. | lb. | .11 | @ | .11½ |
| Cottonseed, crude | | .08½ | @ | .08¾ |
| Cycline | gal. | .27 | @ | .34 |
| Degras (c.l. 100 bbls.) | lb. | .03¾ | @ | — |
| Less c. l. (10-25 bbls.) | lb. | .04 | @ | — |
| Lots less than 10 bbls. | lb. | .04¼ | @ | .04½ |
| Fluxrite | lb. | .95 | @ | .96 |
| Hexalin | lb. | .60 | @ | — |
| Acetate | lb. | .70 | @ | — |
| Linseed, Raw C.L. bbl. | lb. | .09½ | @ | .10 |
| Palm Lagos | lb. | .07¼ | @ | .07½ |
| Niger | lb. | .07¾ | @ | .08 |
| Vansulol | lb. | .10½ | @ | — |
| Para-Flux | gal. | .17 | @ | — |
| Petrolatum, white | lb. | .08 | @ | .08½ |
| dark amber | lb. | .03¾ | @ | .03¾ |
| Pigmentaroil | gal. | .21 | @ | .26 |
| Pine, steam distilled | gal. | .65 | @ | .70 |
| destructively distilled | gal. | .55 | @ | .58 |
| Witco Palm Oil | lb. | .11 | @ | — |
| Witco Softener (f.o.b. works) | lb | .02 | @ | — |
| **Resins and Pitches** | | | | |
| Pitch, Burgundy | lb. | .06½ | @ | .07½ |
| coal tar | gal. | .05½ | @ | .06 |
| pine, 200 lb. gr. wt. | bbl. | 9.00 | @ | 10.00 |
| Rosin, grade K, 280 lb. bbl. | | 8.55 | @ | — |
| Pigmentar | lb. | .038 | @ | .0446 |
| Solvenol, drums | gal. | .48 | @ | .50 |
| Tarol, drums | gal. | .30 | @ | .35 |
| Tar Retort, 50 gal. | bbl. | 12.50 | @ | 13.00 |
| **Solvents** | | | | |
| Acetone, pure | lb. | .13 | @ | |
| Alcohol denatured, No. 1 bbls. | gal. | .37½ | @ | .44½ |
| Benzol, 90% | gal. | .28 | @ | — |
| Carbon bisulphide | lb. | .05½ | @ | .06¼ |
| Carbon tetrachloride | lb. | .06¼ | @ | .07 |
| Motor gasoline, steel bbls. | gal. | .17 | @ | — |
| Naptha, solvent | gal. | .35 | @ | .40 |
| Turpentine, spirits | gal. | .60 | @ | .64 |
| wood | gal. | .50 | @ | .54 |
| destructively distilled | gal. | .40 | @ | .43 |
| **Waxes** | | | | |
| Beeswax | lb. | .56 | @ | .58 |
| Carnauba | lb. | .33 | @ | — |
| Ceresin, white | lb. | .10 | @ | .11 |
| Montan, crude | lb. | .07 | @ | .07½ |
| Ozokerite, black | lb. | .24 | @ | .25 |
| green | lb. | .26 | @ | .30 |
| Paraffin (c. l.—f.o.b. N. Y.) Yellow crude scale | lb. | .03¾ | @ | |
| White crude scale 124/126 | lb | .04 | @ | |
| Refined, 125/127 | lb. | .05¾ | @ | |
| Refined, 128/130 | lb. | .06½ | @ | |
| Refined, 135/137 | lb. | .07¾ | @ | |
| Refined, 138/140 | lb. | .08¼ | @ | |
| **Miscellaneous** | | | | |
| RSL Mold Solution | gal. | .75 | @ | .100 |

### ANTI-OXIDANTS

| | | | | |
|---|---|---|---|---|
| Albasan | lb. | .70 | @ | .75 |
| Antox | lb. | | | |
| Neozone | lb. | | | |
| Oxynone | lb. | .68 | @ | .80 |
| Resistox | lb. | .54 | @ | .57 |
| Stabilite | lb. | .64 | @ | — |
| VGB | lb. | .55 | @ | .66 |

### SUBSTITUTES

| | | | | |
|---|---|---|---|---|
| Black | lb. | .08 | @ | .14 |
| White | lb. | .10 | @ | .16 |
| Brown | lb. | .08 | @ | .15 |

### VULCANIZING INGREDIENTS

| | | | | |
|---|---|---|---|---|
| Sulfur Chloride (drums) | lb. | .03¼ | @ | .03½ |
| Sulfur flour, Refined, 100% pure (bags) | cwt. | 2.40 | @ | 2.75 |
| Commercial (bags) | cwt. | 1.75 | @ | 2.10 |

TIRES & TUBES
CRUDE RUBBER

# STATISTICAL SECTION

AUTOMOBILES
GASOLINE

SUDDEN rising of the amounts of crude rubber being invoiced to the United States was one of the outstanding features of the past fortnight in view of the current curtailment of consumption in this country. After averaging 7,500 tons for several weeks, the quantity of rubber shipped to America jumped to 11,298 tons in the first week of September. This is the largest week's shipment to the United States since the first week in April.

Stocks of crude rubber at London increased another 2,300 tons during the fortnight and on September 14 stood at the highest figure since the end of June, 1928. August consumption in the United States being higher than the corrected figure for imports is expected to be, stocks on hand here have dropped 1,766 tons to 90,769 tons as of August 31. This is the lowest figure for American stocks since the end of February, but heavier stocks afloat and higher shipments from British Malaya are expected to bring inventories in this country up to the 100,000-ton mark before the end of the year.

Declines in tire and tube inventories in the hands of domestic manufacturers by the end of July are the most optimistic developments of the period. After gaining steadily for nine months, these stocks had attained a record peak by the close of June and their reduction was felt essential to the continued prosperity of the industry.

Latest figures covering imports and exports from the leading producing and consuming countries have been added to the appropriate tables in this section.

**PLAN OF THE SECTION**

**The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available. The section accordingly affords the most up-to-date, complete and convenient statistical service in the industry.**

**Table of Contents**

United States Rubber Imports and Exports
Rubber Consumption in the United States
Rubber Invoiced to the United States
Daily Rubber Prices in New York
Monthly and Annual Rubber Prices
London Official Rubber Prices
Daily Cotton Prices in New York
Stocks of Crude Rubber in the U. S.
Stocks of Crude Rubber in London
Rubber in Singapore and Penang
United States Tire and Tube Statistics
Automobile Production—U. S. and Canada
Rims Inspected and Passed in the U. S.
United States Consumption of Gasoline
Rubber Exports from Producing Countries
Rubber Imports into Consuming Countries

## U. S. Imports and Exports of Crude Rubber

| | Gross Imports | | | Re-exports | | | Net Imports |
|---|---|---|---|---|---|---|---|
| YEARS | Long Tons | Total Declared Value | Average Declared Value per pound Cents | Long Tons | Total Declared Value | Average Declared Value per pound Cents | Long Tons |
| 1921 | 185,394 | 73,772,677 | 17.76 | 5,716 | 2,414,924 | 18.86 | 179,678 |
| 1922 | 301,076 | 101,843,188 | 15.10 | 4,809 | 1,921,828 | 17.84 | 296,267 |
| 1923 | 809,144 | 185,060,304 | 26.72 | 8,772 | 5,672,319 | 28.87 | 800,372 |
| 1924 | 328,056 | 174,231,331 | 23.71 | 10,309 | 6,057,637 | 26.23 | 317,747 |
| 1925 | 396,642 | 429,705,014 | 48.36 | 14,827 | 19,847,753 | 59.76 | 381,815 |
| 1926 | 413,338 | 505,817,807 | 54.63 | 17,671 | 22,470,583 | 56.77 | 395,667 |
| 1927 | 426,258 | 339,874,774 | 35.60 | 27,775 | 24,735,488 | 39.76 | 398,483 |
| 1928 | 439,731 | 244,854,973 | 25.03 | 32,159 | 18,128,361 | 25.17 | 407,572 |
| 1927: | | | | | | | |
| Jan. | 43,340 | 36,753,719 | 37.86 | 1,525 | 1,444,734 | 42.28 | 41,815 |
| Feb. | 28,337 | 23,110,257 | 36.41 | 2,451 | 2,277,297 | 41.47 | 25,886 |
| Mar. | 35,515 | 28,693,016 | 36.07 | 2,763 | 3,249,665 | 52.50 | 32,752 |
| Apr. | 46,202 | 37,321,505 | 36.06 | 1,575 | 1,428,425 | 40.48 | 44,627 |
| May | 36,518 | 30,984,377 | 37.88 | 2,782 | 2,501,562 | 40.14 | 33,736 |
| June | 33,045 | 27,850,014 | 37.62 | 1,775 | 1,550,592 | 39.00 | 31,270 |
| July | 37,677 | 31,678,259 | 37.53 | 1,958 | 1,560,853 | 35.59 | 35,719 |
| Aug. | 32,810 | 26,396,931 | 35.92 | 1,809 | 1,382,768 | 34.12 | 31,001 |
| Sept. | 33,301 | 25,314,412 | 33.94 | 3,500 | 3,036,929 | 38.74 | 29,801 |
| Oct. | 30,184 | 22,163,282 | 32.78 | 2,513 | 2,042,713 | 36.29 | 27,671 |
| Nov. | 38,592 | 27,395,428 | 31.69 | 2,469 | 2,014,196 | 36.43 | 36,123 |
| Dec. | 30,737 | 22,213,574 | 32.26 | 2,655 | 2,245,754 | 37.77 | 28,082 |
| 1928: | | | | | | | |
| Jan. | 39,107 | 30,278,444 | 34.56 | 1,988 | 1,734,990 | 38.95 | 37,119 |
| Feb. | 33,663 | 27,763,655 | 36.82 | 2,738 | 2,229,589 | 36.35 | 30,925 |
| Mar. | 40,611 | 32,103,042 | 35.29 | 3,718 | 2,587,435 | 31.07 | 36,893 |
| Apr. | 37,935 | 27,287,266 | 32.11 | 2,272 | 1,415,024 | 27.80 | 35,663 |
| May | 31,059 | 19,058,672 | 27.39 | 2,399 | 1,386,307 | 25.80 | 28,660 |
| June | 27,765 | 14,121,219 | 22.71 | 2,621 | 1,400,697 | 23.86 | 25,144 |
| July | 31,258 | 14,144,765 | 20.20 | 3,087 | 1,451,446 | 20.99 | 28,171 |
| Aug. | 31,204 | 12,860,150 | 18.39 | 2,377 | 1,084,646 | 20.37 | 28,827 |
| Sept. | 39,835 | 16,512,019 | 18.50 | 3,038 | 1,384,148 | 20.34 | 36,797 |
| Oct. | 44,058 | 18,200,332 | 18.44 | 2,405 | 1,085,407 | 20.15 | 41,653 |
| Nov. | 36,519 | 14,878,441 | 18.19 | 2,788 | 1,207,089 | 18.52 | 33,731 |
| Dec. | 43,511 | 17,580,966 | 18.04 | 2,738 | 1,165,743 | 19.00 | 40,773 |
| 1929: | | | | | | | |
| Jan. | 57,564 | 22,872,943 | 17.74 | 3,663 | 1,773,401 | 21.61 | 53,901 |
| Feb. | 64,265 | 24,760,111 | 17.20 | 2,955 | 1,374,783 | 20.77 | 61,310 |
| Mar. | 50,604 | 20,380,905 | 17.98 | 4,218 | 2,094,037 | 22.16 | 46,386 |
| Apr. | 55,725 | 25,542,726 | 20.46 | 3,293 | 1,624,287 | 22.02 | 52,432 |
| May | 51,161 | 24,355,511 | 21.25 | 2,386 | 1,349,690 | 21.24 | 48,325 |
| June | 41,663 | 18,799,307 | 20.14 | 3,152 | 1,470,746 | 20.83 | 38,511 |
| July | 43,944 | 19,342,147 | 19.65 | 3,424 | 1,590,411 | 20.73 | 40,520 |
| Aug. | 37,222 | 16,530,090 | 19.83 | | | | |
| Sept. | | | | | | | |
| Oct. | | | | | | | |
| Nov. | | | | | | | |
| Dec. | | | | | | | |

## U. S. Consumption of Crude Rubber

*(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)*

**Figures on Monthly Basis**

| | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|---|---|
| Jan. | 16,938 | 30,106 | 29,058 | 29,638 | 32,196 | 31,518 | 34,403 | 43,002 |
| Feb. | 14,767 | 30,149 | 25,736 | 19,761 | 31,136 | 30,137 | 33,702 | 41,594 |
| Mar. | 21,408 | 36,629 | 28,385 | 33,498 | 32,936 | 36,141 | 35,688 | 44,730 |
| Apr. | 19,294 | 29,085 | 27,129 | 34,139 | 32,696 | 35,871 | 32,772 | 47,521 |
| May | 23,246 | 36,155 | 25,845 | 35,322 | 29,364 | 34,592 | 37,333 | 49,233 |
| June | 31,718 | 24,272 | 22,753 | 35,822 | 28,598 | 33,801 | 37,676 | 43,227 |
| July | 24,522 | 17,685 | 23,396 | 36,053 | 27,577 | 29,219 | 37,407 | 41,526 |
| Aug. | 29,631 | 20,359 | 28,982 | 35,909 | 34,533 | 33,460 | 42,927 | 38,274 |
| Sept. | 24,410 | 17,594 | 31,497 | 31,691 | 32,904 | 27,214 | 39,882 | |
| Oct. | 26,881 | 21,321 | 31,520 | 29,047 | 29,836 | 26,790 | 40,857 | |
| Nov. | 24,950 | 20,437 | 27,289 | 28,853 | 28,080 | 26,792 | 37,461 | |
| Dec. | 25,070 | 31,902 | 27,199 | 28,748 | 26,293 | 25,492 | 31,232 | |
| Totals | 282,560 | 305,694 | 328,769 | 388,481 | 366,149 | 371,027 | 441,340 | |

**Figures on Quarterly Basis**

| Quarter | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|---|---|
| Jan./Mar. | | 96,776 | 87,609 | 95,263 | 94,301 | 99,216 | 103,558 | 128,565 |
| Apr./June | 127,360 | 89,493 | 75,674 | 104,099 | 87,109 | 103,242 | 103,500 | 139,292 |
| July/Sept. | | 55,621 | 83,813 | 99,493 | 93,793 | 89,210 | 117,573 | |
| Oct./Dec. | 155,067 | 63,617 | 92,656 | 85,789 | 83,212 | 80,860 | 117,597 | |
| Totals | 282,427 | 305,507 | 339,752 | 384,644 | 358,415 | 372,528 | 442,227 | 267,857 |

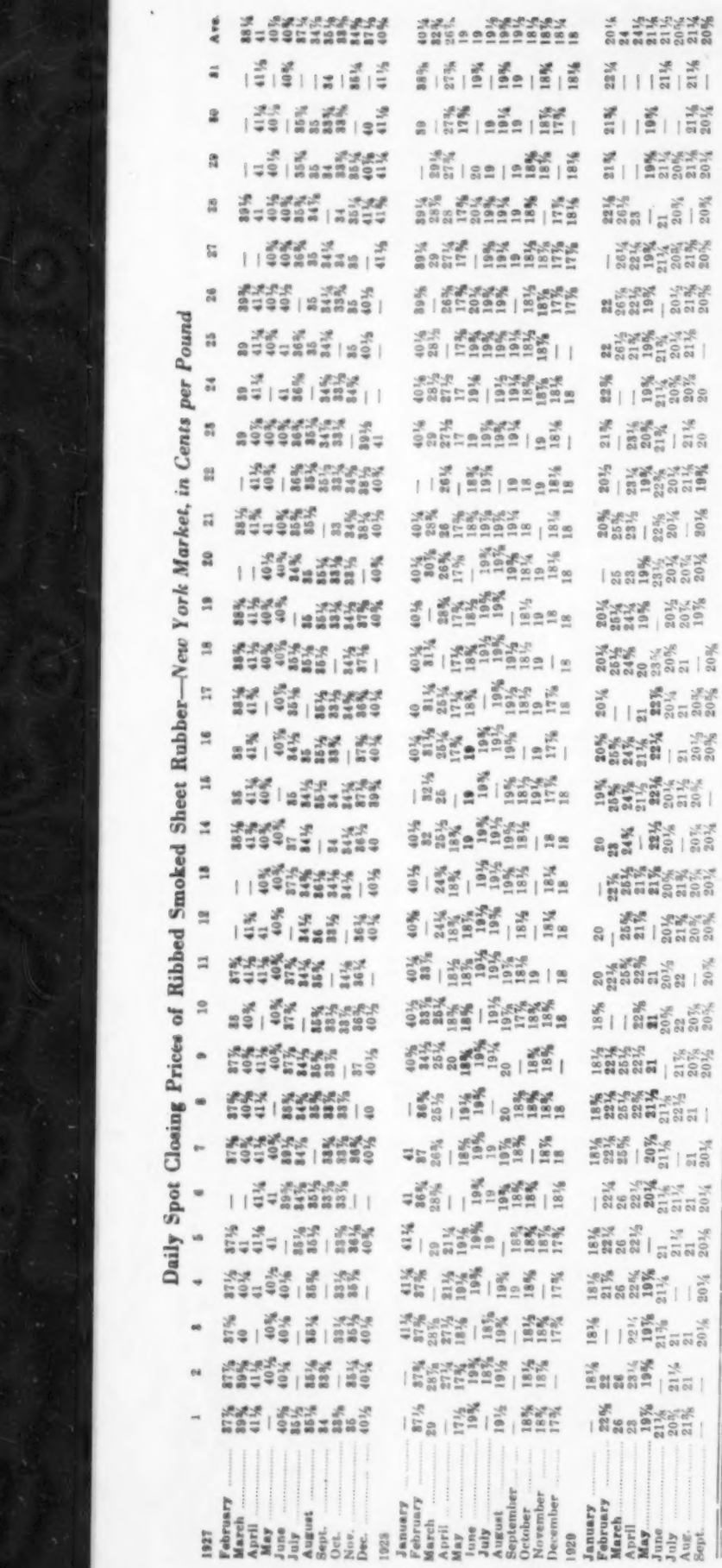
Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

## Rubber Invoiced to the U. S.

*(Reported by American Consuls—Quantities in Long Tons)*

| During the Week Ended | From Br. Malaya | From Ceylon | From Dutch East Indies | From London & Liverpool | Total |
|---|---|---|---|---|---|
| June 22 | 6,393 | 802 | 1,555 | 132 | 8,882 |
| June 29 | 6,103 | 1,416 | 1,946 | 73 | 9,538 |
| July 6 | 6,123 | 358 | 1,909 | 86 | 8,476 |
| July 13 | 6,648 | 927 | 1,708 | 7 | 9,290 |
| July 20 | 5,107 | 839 | 1,313 | 56 | 7,315 |
| July 27 | 6,649 | 432 | 1,988 | 75 | 9,144 |
| Aug. 3 | 4,784 | 780 | 1,251 | 10 | 6,825 |
| Aug. 10 | 5,850 | 873 | 1,222 | — | 7,945 |
| Aug. 17 | 5,444 | 593 | 1,444 | 33 | 7,514 |
| Aug. 24 | 5,560 | 602 | 1,401 | 23 | 7,586 |
| Aug. 31 | 5,408 | 657 | 1,338 | 3 | 7,406 |
| Sept. 7 | 8,313 | 1,691 | 1,256 | 38 | 11,298 |
| Sept. 14 | 7,318 | 1,080 | 1,674 | 37 | 10,109 |

## Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*



# Average Spot Closing Prices—Ribbed Smoked Sheets

*(New York Market)*

### Average Price per Pound for Years 1910-1921

| Year | Cents | Year | Cents | Year | Cents |
|---|---|---|---|---|---|
| 1910 | 206.60 | 1914 | 65.33 | 1918 | 60.15 |
| 1911 | 141.30 | 1915 | 65.85 | 1919 | 48.70 |
| 1912 | 121.60 | 1916 | 72.50 | 1920 | 36.30 |
| 1913 | 82.04 | 1917 | 72.23 | 1921 | 16.36 |

### Average Monthly Price per Pound Since 1922

| Months | 1922 Cents | 1923 Cents | 1924 Cents | 1925 Cents | 1926 Cents | 1927 Cents | 1928 Cents | 1929 Cents |
|---|---|---|---|---|---|---|---|---|
| Jan. | 18.82 | 32.73 | 25.86 | 36.71 | 79.50 | 38.75 | 40.25 | 20.14 |
| Feb. | 16.12 | 35.14 | 25.29 | 36.01 | 62.25 | 38.25 | 32.75 | 23.97 |
| Mar. | 14.53 | 34.21 | 22.83 | 41.00 | 59.00 | 41.04 | 26.82 | 24.55 |
| Apr. | 15.99 | 32.48 | 22.51 | 43.64 | 51.25 | 40.86 | 18.97 | 21.18 |
| May | 15.25 | 27.39 | 18.89 | 58.47 | 47.75 | 40.76 | 18.99 | 21.46 |
| June | 15.11 | 26.88 | 18.81 | 77.26 | 42.50 | 37.25 | 19.59 | 20.64 |
| July | 14.67 | 26.10 | 22.16 | 103.16 | 41.03 | 34.87 | 19.40 | 21.30 |
| Aug. | 13.93 | 28.84 | 26.17 | 82.99 | 38.50 | 35.12 | 19.46 | 20.59 |
| Sept. | 14.44 | 28.95 | 27.56 | 88.88 | 41.00 | 33.67 | 18.47 | — |
| Oct. | 19.78 | 26.93 | 31.13 | 98.01 | 42.50 | 34.32 | 18.83 | — |
| Nov. | 23.88 | 27.14 | 34.33 | 104.80 | 38.50 | 37.58 | 18.26 | — |
| Dec. | 27.42 | 26.60 | 37.88 | 98.51 | 38.25 | 40.63 | 17.97 | — |
| Average for Year | 17.50 | 29.45 | 26.20 | 72.46 | 48.50 | 37.72 | 22.48 | — |

# London Closing Prices of Ribbed Smoked Sheet

*(In Pence Per Pound)*

| Day | June | July | Aug. | Sept. | Day | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10¾ | 10⅝ | 11 | — | 17 | 10½ | 11 | 10¼ | 10¼ |
| 2 | — | 10⅞ | 11 | 10¼ | 18 | 10½ | 10⅞ | — | 10¼ |
| 3 | 10⅞ | 10⅞ | — | 10¼ | 19 | 10⅝ | 10⅜ | 10⅛ | — |
| 4 | 10⅝ | 10⅞ | — | 10¼ | 20 | 10½ | 10⅜ | 10¼ | — |
| 5 | 10⅝ | 11 | — | 10¼ | 21 | 10½ | — | 10¼ | — |
| 6 | 10½ | 11¼ | 10⅞ | 10¼ | 22 | 10½ | 11 | 10¼ | — |
| 7 | 10⅝ | — | 10⅞ | 10⅛ | 23 | — | 11 | 10¼ | — |
| 8 | 10⅝ | 11½ | 10⅜ | — | 24 | 10½ | 10⅞ | 10⅝ | — |
| 9 | — | 11½ | 10⅜ | 10⅛ | 25 | 10½ | 11 | — | — |
| 10 | 10½ | 11½ | 10⅜ | 10¼ | 26 | 10½ | 11¼ | 10⅜ | — |
| 11 | 10⅝ | 11½ | — | 10¼ | 27 | 10⅝ | 11⅛ | 10⅜ | — |
| 12 | 10⅝ | 11¼ | 10⅝ | 10¼ | 28 | 10⅝ | — | 10½ | — |
| 13 | 10⅝ | 11¼ | 10⅝ | 10¼ | 29 | 10⅝ | 11 | 10⅜ | — |
| 14 | 10½ | — | 10⅝ | 10¼ | 30 | — | 11 | 10¼ | — |
| 15 | 10½ | 11¼ | 10½ | — | 31 | — | 11 | 10¼ | — |
| 16 | — | 11 | 10⅜ | 10¼ | | | | | |

### Average Monthly Price Per Pound

| Month | 1927 Pence | 1928 Pence | 1929 Pence | Month | 1927 Pence | 1928 Pence | 1929 Pence |
|---|---|---|---|---|---|---|---|
| Jan. | 19.410 | 19.310 | 9.942 | Aug. | 17.202 | 9.300 | 10.505 |
| Feb. | 19.021 | 15.713 | 11.875 | Sept. | 16.293 | 8.530 | — |
| Mar. | 20.125 | 12.736 | 12.135 | Oct. | 16.366 | 8.807 | — |
| Apr. | 19.897 | 8.864 | 10.490 | Nov. | 18.159 | 8.596 | — |
| May | 19.769 | 8.845 | 10.717 | Dec. | 19.690 | 8.570 | — |
| June | 17.880 | 9.293 | 10.580 | Average for Year | 18.375 | 10.656 | — |
| July | 16.770 | 9.312 | 11.065 | | | | |

# Spot Closing Cotton Prices

*(Middling Upland Grade—New York Market)*

### Recent Daily Price Per Pound

| Day of Month | Aug. | Sept. | Day of Month | Aug. | Sept. | Day of Month | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|
| 1 | 19.20 | — | 11 | — | 18.75 | 21 | 18.50 | — |
| 2 | 18.85 | — | 12 | 18.10 | 18.70 | 22 | 18.65 | — |
| 3 | 19.00 | 19.55 | 13 | 18.30 | 18.70 | 23 | 18.65 | — |
| 4 | — | 19.25 | 14 | 18.15 | 18.70 | 24 | 18.70 | — |
| 5 | 18.90 | 19.10 | 15 | 18.00 | — | 25 | — | — |
| 6 | 18.95 | 19.20 | 16 | 18.20 | 18.70 | 26 | 18.65 | — |
| 7 | 18.95 | 19.20 | 17 | 18.35 | 18.70 | 27 | 18.70 | — |
| 8 | 18.35 | — | 18 | 18.35 | 18.60 | 28 | 18.90 | — |
| 9 | 18.10 | 19.35 | 18 | — | — | 29 | 19.05 | — |
| 10 | 17.95 | 18.95 | 19 | 18.75 | — | 30 | 19.25 | — |
| | | | 20 | 18.85 | — | 31 | — | — |

### Average Monthly Price Per Pound

| Month | 1927 Cents | 1928 Cents | 1929 Cents | Month | 1927 Cents | 1928 Cents | 1929 Cents |
|---|---|---|---|---|---|---|---|
| Jan. | 18.42 | 19.12 | 20.22 | Aug. | 20.04 | 19.28 | 18.62 |
| Feb. | 14.10 | 18.40 | 20.21 | Sept. | 21.95 | 18.67 | — |
| Mar. | 14.32 | 19.38 | 20.19 | Oct. | 20.22 | 19.62 | — |
| Apr. | 14.75 | 20.63 | 20.29 | Nov. | 20.22 | 19.84 | — |
| May | 16.07 | 21.58 | 19.41 | Dec. | 19.58 | 20.22 | — |
| June | 16.85 | 21.50 | 18.74 | Average for Year | 17.49 | 19.97 | — |
| July | 18.00 | 21.36 | 18.62 | | | | |

## Stock of Crude Rubber in the U. S.

*(All Quantities in Long Tons)*

| At End of | ON HAND | | | AFLOAT | | | ON HAND AND AFLOAT | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 |
| Jan. | 76,172 | 110,244 | 76,342 | 45,312 | 41,256 | 78,596 | 121,484 | 151,500 | 154,938 |
| Feb. | 91,186 | 108,955 | 90,058 | 42,166 | 43,316 | 63,825 | 133,352 | 152,271 | 153,883 |
| March | 85,740 | 114,061 | 100,536 | 49,600 | 39,324 | 56,476 | 135,340 | 153,385 | 157,012 |
| April | 92,757 | 113,083 | 107,659 | 38,963 | 33,986 | 55,409 | 131,720 | 147,069 | 163,068 |
| May | 94,563 | 105,356 | 97,192 | 44,181 | 34,374 | 55,404 | 138,744 | 139,730 | 152,596 |
| June | 89,250 | 90,198 | 92,061 | 47,283 | 40,001 | 46,035 | 136,483 | 130,119 | 138,096 |
| July | 98,469 | 83,242 | 92,535 | 40,687 | 42,304 | 38,858 | 139,056 | 125,546 | 134,393 |
| Aug. | 96,148 | 68,994 | 90,769 | 40,937 | 51,875 | 41,618 | 137,085 | 120,869 | 132,387 |
| Sept. | 97,829 | 68,851 | | 37,966 | 48,566 | | 135,793 | 117,417 | |
| Oct. | 97,452 | 66,421 | | 42,804 | 41,571 | | 140,256 | 107,992 | |
| Nov. | 101,034 | 61,956 | | 37,076 | 68,119 | | 138,110 | 130,075 | |
| Dec. | 100,130 | 66,166 | | 47,938 | 68,764 | | 148,068 | 134,930 | |

(Rubber Manufacturers' Association figures raised to 100%.)

## Stock of Crude Rubber in London

**(No. of tons in Wharves and Warehouses, including Latex)**

| At end of: | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 56,573 | 67,252 | 73,498 | 57,460 | 27,172 | 9,994 | 54,994 | 66,524 | 25,191 |
| Feb. | 59,439 | 67,623 | 70,483 | 56,732 | 23,425 | 10,004 | 58,826 | 62,964 | 25,554 |
| Mar. | 63,913 | 66,670 | 63,438 | 55,647 | 18,104 | 13,127 | 63,055 | 58,272 | 28,214 |
| Apr. | 68,759 | 68,637 | 58,770 | 54,559 | 12,949 | 18,773 | 66,897 | 53,425 | 31,368 |
| May | 70,403 | 70,146 | 54,439 | 51,615 | 5,895 | 20,384 | 67,169 | 44,628 | 31,290 |
| June | 69,408 | 71,597 | 51,050 | 51,115 | 5,318 | 23,984 | 63,902 | 38,756 | 31,025 |
| July | 71,065 | 71,515 | 49,937 | 52,073 | 4,258 | 27,727 | 63,717 | 35,429 | |
| Aug. | 73,211 | 72,112 | 58,427 | 49,700 | 4,619 | 30,165 | 64,491 | 32,084 | |
| Sept. | 72,175 | 70,977 | 54,523 | 44,011 | 5,453 | 35,077 | 68,236 | 31,440 | |
| Oct. | 69,229 | 68,536 | 58,891 | 37,523 | 5,086 | 42,138 | 69,569 | 24,207 | |
| Nov. | 70,786 | 68,548 | 60,074 | 33,593 | 3,869 | 44,057 | 67,050 | 17,775 | |
| Dec. | 69,792 | 72,299 | 60,246 | 29,488 | 5,697 | 48,918 | 63,793 | 19,815 | |

### At End of Recent Weeks

| | First Saturday | Second Saturday | Third Saturday | Fourth Saturday | Fifth Saturday |
|---|---|---|---|---|---|
| 1928 | | | | | |
| September | 31,933 | 31,477 | 32,110 | 31,884 | 31,462 |
| October | 29,525 | 27,370 | 26,477 | 24,240 | |
| November | 22,919 | 21,494 | 20,194 | 18,724 | |
| December | 16,855 | 16,517 | 17,669 | 18,821 | 19,727 |
| 1929 | | | | | |
| January | 21,953 | 23,016 | 23,547 | 24,423 | |
| February | 25,389 | 25,413 | 24,757 | 25,005 | |
| March | 25,441 | 25,920 | 26,442 | 27,656 | 28,077 |
| April | 28,934 | 30,446 | 30,503 | 31,213 | |
| May | 31,580 | 31,127 | 30,955 | 30,893 | |
| June | 31,539 | 31,635 | 31,127 | 30,617 | 30,982 |
| July | 29,996 | 30,661 | 30,790 | 30,167 | |
| August | 30,937 | 31,444 | 33,573 | 34,651 | 35,605 |
| September | 36,620 | 37,901 | | | |

## Rubber in Singapore and Penang

*(Stocks held by Dealers—Quantities in Long Tons)*

| End of | 1927 | 1928 | 1929 | End of | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|---|
| Jan. | 25,440 | 25,868 | 29,617 | July | 22,558 | 18,663 | 33,859 |
| Feb. | 26,766 | 22,867 | 32,373 | Aug. | 25,764 | 18,971 | 30,834 |
| Mar. | 27,844 | 20,538 | 29,437 | Sept. | 25,178 | 14,898 | — |
| Apr. | 24,543 | 16,946 | 26,474 | Oct. | 25,790 | 12,149 | — |
| May | 25,133 | 17,437 | 30,764 | Nov. | 28,369 | 29,188 | — |
| June | 21,898 | 18,207 | 30,403 | Dec. | 25,798 | 32,895 | — |

## Rims Inspected and Passed in U. S.

*(Tire and Rim Association Reports)*

| | Total | Per Cent Balloons | | Total | Per Cent Balloons |
|---|---|---|---|---|---|
| 1923 | 23,140,620 | 0.6 | 1926 | 24,199,524 | 78.8 |
| 1924 | 21,863,311 | 19.7 | 1927 | 19,700,003 | 79.1 |
| 1925 | 26,001,664 | 66.8 | 1928 | 24,247,282 | 81.6 |
| 1928 | | | 1929 | | |
| January | 1,835,207 | 79.4 | July | 1,896,666 | 78.2 |
| February | 2,265,024 | 80.8 | August | 1,570,099 | 79.4 |
| March | 2,613,389 | 80.4 | September | | |
| April | 2,729,899 | 81.3 | October | | |
| May | 2,574,224 | 76.5 | November | | |
| June | 2,184,219 | 75.3 | December | | |

## U. S. Consumption of Gasoline

*(In Barrels of 42 Gallons)*

| MONTHS | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|
| January | 14,386,000 | 17,582,000 | 17,888,000 | 20,938,000 | 22,602,000 |
| February | 13,210,000 | 15,814,000 | 18,240,000 | 21,136,000 | 22,776,000 |
| March | 14,890,000 | 19,302,000 | 22,464,000 | 24,041,000 | 28,495,000 |
| April | 19,013,000 | 20,848,000 | 23,371,000 | 25,712,000 | 32,019,000 |
| May | 20,459,000 | 24,213,000 | 26,579,000 | 27,355,000 | 34,117,000 |
| June | 20,724,000 | 23,803,000 | 27,799,000 | 29,022,000 | 33,163,000 |
| July | 22,879,000 | 24,752,000 | 29,784,000 | 30,960,000 | 36,860,000 |
| August | 22,323,000 | 26,912,000 | 29,779,000 | 33,143,000 | |
| September | 20,177,000 | 22,929,000 | 28,409,000 | 29,691,000 | |
| October | 19,826,000 | 23,973,000 | 25,497,000 | 30,610,000 | |
| November | 18,024,000 | 20,618,000 | 24,400,000 | 26,222,000 | |
| December | 17,954,000 | 21,419,000 | 23,718,000 | 26,644,000 | |
| TOTAL | 223,865,000 | 262,165,000 | 297,928,000 | 327,932,000 | |

## U. S. Tire and Tube Statistics

*(All Figures Represent Thousands)*

### AUTOMOBILE CASINGS

**Figures for Recent Years**

| | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| Production | 40,932 | 45,259 | 51,633 | 60,845 | 61,237 | 64,439 | 77,944 |
| Shipments | 39,987 | 45,204 | 50,120 | 59,262 | 59,002 | 64,059 | 74,296 |
| Inventory[2] | 6,132 | 5,772 | 7,427 | 8,142 | 10,456 | 10,264 | 13,624 |

**Figures for Recent Months**

| | PRODUCTION | | | SHIPMENTS | | | INVENTORY | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 |
| Jan. | 4,965 | 5,358 | 6,722 | 4,932 | 5,394 | 6,626 | 10,432 | 9,949 | 13,712 |
| Feb. | 5,095 | 6,363 | 6,912 | 4,458 | 5,031 | 5,282 | 11,075 | 11,721 | 15,495 |
| Mar. | 6,276 | 6,819 | 7,519 | 5,701 | 5,731 | 6,708 | 11,683 | 12,389 | 16,351 |
| Apr. | 6,299 | 6,178 | 7,884 | 5,701 | 5,812 | 7,294 | 12,122 | 12,71. | 16,929 |
| May | 6,151 | 6,759 | 8,145 | 5,657 | 6,457 | 7,184 | 12,462 | 13,024 | 17,849 |
| June | 6,202 | 6,692 | 7,804 | 6,253 | 7,117 | 7,254 | 12,462 | 12,162 | 17,957 |
| July | 5,087 | 6,498 | 6,475 | 5,973 | 7,895 | 7,855 | 11,326 | 11,157 | 15,830 |
| Aug. | 5,752 | 7,469 | | 6,393 | 8,403 | | 10,721 | 10,034 | |
| Sept. | 4,822 | 6,802 | | 5,717 | 7,145 | | 9,722 | 9,765 | |
| Oct. | 4,773 | 7,326 | | 4,799 | 5,717 | | 9,665 | 11,520 | |
| Nov. | 4,502 | 6,075 | | 4,306 | 4,998 | | 10,136 | 12,579 | |
| Dec. | 4,497 | 5,605 | | 4,165 | 4,591 | | 10,264 | 13,624 | |

### AUTOMOBILE INNER TUBES

**Figures for Recent Years**

| | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| Production | 50,850 | 60,116 | 70,706 | 82,614 | 76,618 | 70,823 | 80,180 |
| Shipments | 49,673 | 59,072 | 68,016 | 81,004 | 71,591 | 72,896 | 77,127 |
| Inventory[2] | 7,648 | 8,425 | 11,052 | 11,818 | 16,200 | 13,692 | 16,117 |

**Figures for Recent Months**

| | PRODUCTION | | | SHIPMENTS | | | INVENTORY | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 | 1927 | 1928 | 1929 |
| Jan. | 5,337 | 5,441 | 6,517 | 6,016 | 6,072 | 7,242 | 15,585 | 12,982 | 15,386 |
| Feb. | 5,658 | 6,895 | 6,769 | 5,120 | 5,431 | 5,278 | 16,075 | 14,650 | 16,999 |
| Mar. | 7,184 | 6,231 | 7,466 | 6,157 | 5,731 | 6,737 | 17,096 | 15,573 | 17,750 |
| Apr. | 7,373 | 6,661 | 7,634 | 6,359 | 5,702 | 7,164 | 17,801 | 16,638 | 18,134 |
| May | 6,737 | 7,168 | 7,660 | 6,140 | 6,300 | 7,038 | 18,389 | 17,702 | 18,928 |
| June | 6,306 | 6,953 | 6,978 | 6,832 | 7,136 | 6,950 | 17,858 | 17,159 | 18,741 |
| July | 5,284 | 6,674 | 6,178 | 7,070 | 8,729 | 8,113 | 16,004 | 14,974 | 16,332 |
| Aug. | 6,480 | 8,343 | | 7,983 | 9,350 | | 14,664 | 13,931 | |
| Sept. | 5,651 | 7,103 | | 6,758 | 7,154 | | 13,511 | 13,543 | |
| Oct. | 5,065 | 6,929 | | 5,024 | 5,662 | | 13,539 | 15,285 | |
| Nov. | 4,775 | 5,592 | | 4,723 | 5,002 | | 13,585 | 15,743 | |
| Dec. | 4,969 | 5,184 | | 4,712 | 4,858 | | 13,692 | 16,117 | |

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

## Automobile Production

| | United States | | | Canada | | | |
|---|---|---|---|---|---|---|---|
| | Total | Passenger Cars | Trucks | Total | Passenger Cars | Trucks | Grand Total |
| 1922 | 2,547,208 | 2,302,923 | 244,285 | 102,053 | 94,904 | 7,149 | 2,649,261 |
| 1923 | 4,020,255 | 3,631,728 | 388,527 | 146,438 | 129,228 | 17,210 | 4,166,693 |
| 1924 | 3,600,918 | 3,203,049 | 397,869 | 135,246 | 117,765 | 17,481 | 3,736,164 |
| 1925 | 4,265,704 | 3,760,459 | 505,245 | 161,389 | 139,311 | 22,078 | 4,427,093 |
| 1926 | 4,298,799 | 3,808,753 | 490,046 | 205,092 | 164,483 | 40,609 | 4,503,891 |
| 1927 | 3,393,887 | 2,938,868 | 453,019 | 179,426 | 146,870 | 32,556 | 3,573,313 |
| 1928 | | | | | | | |
| Jan. | 225,039 | 199,032 | 26,007 | 8,463 | 6,705 | 1,758 | 232,502 |
| Feb. | 323,368 | 290,830 | 32,358 | 12,504 | 10,315 | 2,189 | 335,872 |
| March | 412,825 | 371,408 | 41,417 | 9,724 | 7,478 | 2,246 | 422,549 |
| April | 409,948 | 364,877 | 45,071 | 24,240 | 20,546 | 3,694 | 434,188 |
| May | 425,990 | 375,798 | 50,192 | 33,942 | 29,764 | 4,178 | 459,932 |
| June | 396,967 | 356,439 | 40,528 | 28,399 | 25,341 | 3,058 | 425,366 |
| July | 390,445 | 237,933 | 52,512 | 25,226 | 20,122 | 5,104 | 415,671 |
| Aug. | 458,429 | 400,689 | 57,740 | 31,245 | 24,274 | 6,971 | 489,674 |
| Sept. | 413,722 | 358,872 | 54,850 | 21,193 | 16,572 | 4,621 | 434,915 |
| Oct. | 397,096 | 339,976 | 57,120 | 18,536 | 13,016 | 5,520 | 415,632 |
| Nov. | 256,936 | 217,256 | 39,680 | 11,769 | 8,154 | 3,615 | 268,705 |
| Dec. | 233,135 | 205,144 | 27,991 | 9,425 | 6,734 | 2,691 | 242,560 |
| TOTAL | 4,357,384 | 3,826,613 | 530,771 | 242,382 | 196,737 | 45,645 | 4,599,944 |
| 1929 | | | | | | | |
| Jan. | 402,154 | 350,617 | 51,537 | 21,501 | 17,164 | 4,337 | 423,655 |
| Feb. | 466,084 | 407,589 | 58,495 | 31,287 | 28,486 | 2,801 | 497,371 |
| March | 584,733 | 513,266 | 69,559 | 40,621 | 32,833 | 7,788 | 625,354 |
| April | 620,656 | 538,679 | 81,977 | 41,901 | 34,392 | 7,509 | 662,557 |
| May | 603,969 | 516,055 | 86,596 | 31,559 | 25,129 | 6,430 | 635,528 |
| June | 545,252 | 453,956 | 91,296 | 21,492 | 16,511 | 4,981 | 566,744 |
| July | 500,331 | 427,213 | 73,118 | 17,461 | 13,600 | 3,861 | 517,792 |
| Aug. | 499,629 | 444,711 | 54,918 | 14,214 | 11,037 | 3,177 | 513,843 |
| Sept. | | | | | | | |
| Oct. | | | | | | | |
| Nov. | | | | | | | |
| Dec. | | | | | | | |

# Exports of Crude Rubber from Principal Producing Countries

*(Long Tons)*

| | BRITISH MALAYA[1] | | | | | | | | DUTCH EAST INDIES[4] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Exports | Imports | Gross Exports Minus Imports | Ceylon[2] | India & Burma[3] | Sarawak[4] | British North Borneo[3] | Siam[4] | Java & Madura | Sumatra E. Coast | Other D.E.I. | Indo-China[4] | Amazon Valley | All Other[4] | World Total[7] |
| 1923 | 252,016 | 70,432 | 181,584 | 39,971 | 6,416 | 5,705 | 4,237 | 1,718 | 32,930 | 46,344 | 57,822 | 5,067 | 16,765 | 7,856 | 406,955 |
| 1924 | 259,706 | 108,524 | 151,182 | 39,997 | 7,697 | 6,699 | 4,621 | 2,962 | 42,446 | 54,497 | 80,347 | 6,688 | 23,165 | 9,065 | 429,366 |
| 1925 | 316,825 | 158,022 | 158,803 | 49,566 | 10,082 | 5,424 | 5,377 | 5,377 | 46,757 | 65,499 | 120,626 | 7,881 | 25,298 | 13,797 | 517,523 |
| 1926 | 391,328 | 151,243 | 240,085 | 58,962 | 9,874 | 9,155 | 6,079 | 4,027 | 52,186 | 71,413 | 121,231 | 8,203 | 24,298 | 16,017 | 621,530 |
| 1927 | 371,322 | 182,845 | 188,477 | 55,356 | 11,321 | 10,923 | 6,582 | 5,472 | 55,297 | 77,816 | 142,171 | 8,645 | 28,782 | 15,633 | 606,474 |
| 1928 | 409,430 | 149,787 | 259,643 | 57,267 | 10,790 | 10,087 | 6,698 | 4,813 | 58,848 | 82,511 | 121,770 | 9,548 | 21,129 | 10,690 | 653,794 |
| 1927: | | | | | | | | | | | | | | | |
| Aug. | 30,371 | 17,105 | 13,266 | 5,357 | 688 | 1,133 | 623 | 546 | 4,355 | 6,682 | 12,440 | 716 | 1,928 | 969 | 48,703 |
| Sept. | 29,835 | 12,095 | 17,740 | 4,911 | 479 | 645 | 566 | 498 | 3,635 | 5,967 | 9,853 | 497 | 2,072 | 1,213 | 48,066 |
| Oct. | 29,846 | 15,801 | 14,045 | 5,245 | 802 | 721 | 591 | 542 | 3,810 | 7,755 | 13,688 | 775 | 2,752 | 939 | 51,520 |
| Nov. | 28,277 | 19,860 | 8,417 | 4,464 | 1,277 | 1,241 | 591 | 600 | 4,127 | 6,587 | 14,395 | 683 | 2,369 | 1,627 | 46,878 |
| Dec. | 32,185 | 17,865 | 14,320 | 4,130 | 1,395 | 946 | 592 | 664 | 5,763 | 7,878 | 13,438 | 1,191 | 3,340 | 1,444 | 55,101 |
| 1928: | | | | | | | | | | | | | | | |
| Jan. | 27,789 | 16,618 | 11,171 | 3,830 | 1,605 | 842 | 581 | 525 | 4,851 | 7,988 | 11,774 | 1,100 | 2,273 | 1,025 | 47,565 |
| Feb. | 28,548 | 12,911 | 15,937 | 4,947 | 1,081 | 667 | 581 | 536 | 4,052 | 6,757 | 8,630 | 787 | 1,612 | 1,276 | 46,860 |
| Mar. | 27,879 | 10,508 | 17,371 | 3,683 | 775 | 645 | 581 | 269 | 3,999 | 5,825 | 9,690 | 700 | 2,750 | 1,211 | 47,499 |
| Apr. | 20,139 | 9,335 | 10,804 | 3,233 | 789 | 630 | 494 | 258 | 3,993 | 5,040 | 5,499 | 736 | 1,014 | 1,323 | 33,810 |
| May | 26,483 | 10,350 | 16,133 | 3,091 | 654 | 842 | 494 | 241 | 4,943 | 5,355 | 10,347 | 717 | 2,602 | 1,135 | 45,994 |
| June | 22,994 | 16,168 | 6,826 | 3,107 | 963 | 926 | 494 | 451 | 5,419 | 5,863 | 13,655 | 725 | 1,399 | 960 | 40,788 |
| July | 30,481 | 13,353 | 17,098 | 5,129 | 1,043 | 905 | 593 | 366 | 5,602 | 7,566 | 11,594 | 698 | 1,264 | 873 | 52,731 |
| Aug. | 35,674 | 15,114 | 20,560 | 5,720 | 398 | 1,227 | 593 | 544 | 5,668 | 7,438 | 11,893 | 712 | 1,732 | 450 | 56,936 |
| Sept. | 29,769 | 11,239 | 18,530 | 4,675 | 457 | 938 | 594 | 447 | 4,956 | 6,536 | 9,863 | 969 | 1,614 | 494 | 50,073 |
| Oct. | 24,476 | 12,603 | 11,873 | 3,999 | 864 | 949 | 564 | 457 | 5,295 | 7,474 | 10,124 | 513 | 1,399 | 732 | 44,243 |
| Nov. | 68,135 | 10,436 | 57,699 | 8,005 | 1,048 | 772 | 564 | 425 | 4,950 | 7,902 | 7,805 | 943 | 1,790 | 623 | 92,526 |
| Dec. | 66,763 | 11,122 | 55,641 | 7,848 | 1,113 | 744 | 565 | 294 | 5,120 | 8,792 | 10,896 | 948 | 2,220 | 588 | 94,769 |
| 1929: | | | | | | | | | | | | | | | |
| Jan. | 52,546 | 13,415 | 39,131 | 8,301 | 1,664 | 873 | 600 | 461 | 5,640 | 8,067 | 11,076 | 850 | 2,134 | 642 | 79,439 |
| Feb. | 47,926 | 12,103 | 35,823 | 7,064 | 1,117 | 955 | 600 | 495 | 6,572 | 7,511 | 10,384 | 807 | 2,104 | 520 | 73,952 |
| Mar. | 49,448 | 14,553 | 34,895 | 6,583 | 1,413 | 758 | 601 | 499 | 5,515 | 6,620 | 10,629 | 658 | 2,332 | 786 | 71,289 |
| Apr. | 49,816 | 11,414 | 38,402 | 5,097 | 727 | 747 | 500* | 306 | 5,997 | 6,645 | 11,321 | 568 | 1,950 | 569 | 72,829* |
| May | 43,960 | 15,593 | 28,367 | 5,723 | 800 | 966 | 500* | 453 | 6,264 | 6,961 | 13,437 | 650 | 1,922 | 733 | 66,776* |
| June | 40,398 | 14,344 | 26,054 | 5,563 | 1,000* | 1,061 | 500* | 422 | 5,582 | 6,693 | 11,270 | 608 | 1,398 | 650* | 60,801* |
| July | 46,454 | 15,071 | 31,383 | 5,746 | 974 | 1,247 | 500* | 462 | 6,422 | 7,192 | 13,995 | 555 | 1,457 | 700* | 70,633* |
| Aug. | 50,441 | 15,449 | 34,972 | 5,564 | | | | | | | | 545 | 1,563 | | |

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

# Net Imports of Crude Rubber into Principal Manufacturing Countries

*(Long Tons)*

| | United States[5] | United Kingdom | France (h) | Germany | Canada (ac) | Japan (da) | Italy | Russia (ea) | Australia (ed) | Belgium (d) | Netherlands | Scandinavia (abcdf) | Spain (g) | Czechoslovakia (abed) | World Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1919 | 236,977 | 42,671 | 17,685 | 5,584 | 6,395 | 9,753 | 9,894 | 75 | 1,002 | 3,995 | 2,771 | 3,149 | 2,418 | 9 | 342,378 |
| 1920 | 248,762 | 56,844 | 13,885 | 11,890 | 11,746 | 5,297 | 6,128 | 62 | 1,815 | 3,840 | 5,510 | 2,292 | 2,008 | 567 | 370,641 |
| 1921 | 179,678 | 42,087 | 15,135 | 21,920 | 8,124 | 21,713 | 3,906 | 165 | 1,014 | 1,705 | 1,022 | 1,279 | 2,245 | 569 | 300,562 |
| 1922 | 296,267 | 11,724 | 24,352 | 27,546 | 9,207 | 15,934 | 6,430 | 2,493 | 2,643 | 172 | -3,807 | 1,778 | 589 | 567 | 395,885 |
| 1923 | 300,372 | 12,700 | 27,392 | 18,519 | 13,277 | 15,372 | 8,489 | 2,986 | 1,649 | 2,184 | 792 | 2,528 | 630 | 1,128 | 408,018 |
| 1924 | 317,747 | -11,550 | 30,446 | 22,727 | 14,299 | 19,571 | 8,764 | 2,346 | 3,124 | 2,688 | -807 | 3,178 | 944 | 1,370 | 414,847 |
| 1925 | 381,815 | 4,061 | 32,956 | 33,937 | 19,683 | 11,117 | 11,412 | 7,088 | 4,757 | 2,930 | 875 | 3,149 | 1,155 | 1,558 | 516,498 |
| 1926 | 395,667 | 34,865 | 34,240 | 22,775 | 20,229 | 18,126 | 9,809 | 6,529 | 9,021 | 2,498 | 2,670 | 4,046 | 1,299 | 1,870 | 613,649 |
| 1927 | 398,488 | 60,249 | 34,271 | 38,892 | 26,405 | 20,521 | 11,381 | 12,018 | 9,490 | 6,482 | 636 | 4,224 | 2,055 | 2,672 | 627,789 |
| 1928 | 404,496 | 4,846 | 36,498 | 37,855 | 30,447 | 25,621 | 12,433 | 15,134 | 8,430 | 7,958 | 2,243 | 4,418 | 3,178 | 3,138 | 596,695 |
| 1927: | | | | | | | | | | | | | | | |
| July | 35,719 | 1,116 | 2,384 | 2,899 | 2,104 | 1,505 | 1,007 | 415 | 900 | 429 | 66 | 227 | 177 | 236 | 49,184 |
| August | 31,001 | 3,463 | 2,795 | 3,119 | 2,013 | 1,970 | 1,274 | 386 | 650 | 604 | -63 | 312 | 138 | 123 | 47,785 |
| September | 29,801 | 7,800 | 1,956 | 2,891 | 1,850 | 2,026 | 684 | 518 | 772 | 552 | -33 | 451 | 155 | 272 | 49,694 |
| October | 27,671 | 5,888 | 3,479 | 4,202 | 1,790 | 1,966 | 1,021 | 1,075 | 908 | 465 | 156 | 401 | 153 | 363 | 49,538 |
| November | 36,123 | 1,687 | 3,661 | 4,209 | 1,916 | 1,575 | 1,167 | 1,312 | 836 | 749 | 298 | 474 | 246 | 317 | 54,570 |
| December | 28,082 | 309 | 4,696 | 3,108 | 2,302 | 2,710 | 1,462 | 1,453 | 1,242 | 784 | -202 | 514 | 268 | 300 | 47,028 |
| 1928: | | | | | | | | | | | | | | | |
| Jan. | 37,120 | 1,921 | 1,764 | 2,485 | 2,290 | 1,361 | 760 | 755 | 802 | 589 | 52 | 261 | 335 | 376 | 50,871 |
| Feb. | 30,926 | 3,143 | 2,526 | 2,984 | 2,553 | 1,248 | 437 | 783 | 616 | 599 | 98 | 307 | 296 | 297 | 46,813 |
| Mar. | 36,893 | 3,179 | 1,902 | 3,521 | 2,989 | 1,694 | 763 | 231 | 918 | 816 | 95 | 351 | 497 | 398 | 54,247 |
| April | 35,663 | —2,280 | 2,204 | 2,719 | 1,938 | 2,324 | 1,114 | 1,820 | 832 | 575 | 280 | 339 | 304 | 159 | 48,001 |
| May | 28,660 | —5,322 | 3,297 | 2,944 | 2,180 | 2,288 | 1,090 | 3,893 | 655 | 746 | 209 | 485 | 220 | 213 | 41,558 |
| June | 25,143 | —3,031 | 3,597 | 2,968 | 2,186 | 2,102 | 934 | 4,111 | 348 | 743 | 133 | 346 | 251 | 182 | 40,063 |
| July | 28,170 | —1,374 | 3,518 | 3,387 | 2,692 | 2,026 | 1,598 | 724 | 591 | 895 | 395 | 294 | 175 | 384 | 43,475 |
| Aug. | 28,827 | 48 | 3,527 | 2,744 | 2,447 | 1,868 | 875 | 632 | 707 | 519 | 316 | 359 | 58 | 94 | 43,021 |
| Sept. | 36,800 | 4,199 | 3,524 | 3,553 | 2,812 | 1,837 | 1,278 | 20 | 603 | 597 | 345 | 377 | 277 | 235 | 56,457 |
| Oct. | 41,667 | —934 | 3,728 | 4,386 | 2,943 | 3,711 | 1,049 | 98 | 766 | 696 | 141 | 527 | 250 | 318 | 59,346 |
| Nov. | 33,846 | —3,141 | 3,278 | 3,694 | 2,799 | 2,150 | 1,340 | 689 | 837 | 544 | 31 | 337 | 252 | 282 | 46,938 |
| Dec. | 40,781 | 8,438 | 3,633 | 2,470 | 2,618 | 3,002 | 1,145 | 1,378 | 755 | 639 | 148 | 435 | 263 | 200 | 65,905 |
| 1929: | | | | | | | | | | | | | | | |
| Jan. | 53,922 | 11,951 | 5,645 | 4,711 | 3,759 | 3,776 | 1,481 | 956 | 1,081 | 749 | 218 | 638 | 179 | 525 | 89,571 |
| Feb. | 61,331 | 5,179 | 5,001 | 4,613 | 2,908 | 2,727 | 1,259 | 684 | 1,131 | 627 | 113 | 226 | 115 | 356 | 86,275 |
| Mar. | 46,391 | 9,068 | 4,409 | 4,586 | 4,961 | 2,630 | 1,515 | 716 | 725 | 931 | 316 | 354 | 80 | 409 | 77,091 |
| Apr. | 52,447 | 8,295 | 4,854 | 5,351 | 3,177 | 2,308 | 1,407 | 703 | 1,518 | 750 | 144 | 956 | 40 | 445 | 82,395 |
| May | 48,350 | 5,112 | 3,152 | 3,682 | 2,937 | 2,314 | 1,417 | 700* | 1,437 | 854 | 201 | 468 | 37 | 277 | 70,938* |
| June | 38,676 | 5,361 | 6,814 | 3,948 | 3,075 | 1,593 | 1,624 | 700* | 2,215 | 672 | 687 | 507 | 24 | 420 | 66,316* |
| July | 40,914 | 4,993 | | 3,559 | 3,205 | | 2,023 | | 2,918 | 1,039 | 253 | 519 | | | |

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. *United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 208 tons in the first 5 months of 1929.

## Domestic Production of Miscellaneous Rubber Goods

| | Rubber Proofed Fabrics Yards | Rubber Heels Pairs | Rubber Soles Pairs | Mechanical Goods Shipments Dollars |
|---|---|---|---|---|
| 1924 | 25,020,000 | 186,279,000 | (1) | $48,615,000 |
| 1925 | 23,988,000 | 206,970,000 | 16,211,620(2) | 64,877,000 |
| 1926 | 29,328,000 | 183,312,000 | 12,253,000 | 76,789,000 |
| 1927 | 37,872,000 | 201,014,000 | 27,160,000 | 68,625,000 |
| 1928 | 41,179,000 | 235,170,000 | 37,645,000 | 69,114,000 |
| 1928: | | | | |
| January | 2,177,000 | 17,682,000 | 3,431,000 | $5,630,000 |
| February | 2,575,000 | 19,181,000 | 3,628,000 | 5,838,000 |
| March | 2,853,000 | 22,583,000 | 3,747,000 | 6,675,000 |
| April | 2,416,000 | 18,575,000 | 2,928,000 | 5,406,000 |
| May | 2,744,000 | 21,597,000 | 3,519,000 | 6,274,000 |
| June | 2,953,000 | 18,763,000 | 3,321,000 | 6,126,000 |
| July | 3,447,000 | 17,620,000 | 3,168,000 | 5,157,000 |
| August | 4,613,000 | 21,289,000 | 3,461,000 | 6,306,000 |
| September | 4,966,000 | 21,451,000 | 2,725,000 | 5,393,000 |
| October | 5,914,000 | 21,932,000 | 2,297,000 | 5,837,000 |
| November | 4,173,000 | 18,686,000 | 2,649,000 | 5,201,000 |
| December | 2,348,000 | 15,811,000 | 2,771,000 | 5,271,000 |
| 1929: | | | | |
| January | 2,828,000 | 19,975,000 | 3,876,000 | 6,033,000 |
| February | 3,095,000 | 18,979,000 | 2,869,000 | 6,135,000 |
| March | 3,952,000 | 17,226,000 | 2,746,000 | 7,013,000 |
| April | 4,000,000 | 17,256,000 | 2,601,000 | 7,035,000 |
| May | 4,860,000 | 19,541,000 | 2,916,000 | 7,189,000 |
| June | 4,409,000 | 20,007,000 | 2,502,000 | 6,792,000 |
| July | 4,260,000 | | | |

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

## United States Imports of Guayule Rubber and Related Gums

*(All quantities in Long Tons)*

| | Guayule | | Balata | | Jelutong | | Gutta Percha | |
|---|---|---|---|---|---|---|---|---|
| | Tons | Dollars | Tons | Dollars | Tons | Dollars | Tons | Dollars |
| 1919 | 1,430 | 760,690 | 727 | 937,038 | 8,332 | 2,213,964 | 2,900 | 1,068,698 |
| 1920 | 758 | 345,985 | 1,064 | 1,260,043 | 5,672 | 2,068,501 | 3,183 | 1,520,309 |
| 1921 | 58 | 26,945 | 814 | 1,077,859 | 1,745 | 351,893 | 985 | 333,564 |
| 1922 | 127 | 57,040 | 812 | 978,765 | 2,335 | 403,812 | 818 | 281,012 |
| 1923 | 1,155 | 542,227 | 700 | 898,524 | 4,565 | 853,308 | 912 | 375,167 |
| 1924 | 1,356 | 536,392 | 464 | 568,456 | 6,165 | 1,237,100 | 1,408 | 463,610 |
| 1925 | 3,781 | 1,803,448 | 517 | 574,750 | 6,749 | 1,642,531 | 1,603 | 629,284 |
| 1926 | 4,305 | 2,562,096 | 354 | 327,213 | 7,263 | 3,127,757 | 1,445 | 661,156 |
| 1927 | 5,018 | 2,674,957 | 582 | 447,246 | 7,785 | 2,448,657 | 1,494 | 728,172 |
| 1928: | 3,075 | 1,755,685 | 731 | 430,855 | 7,552 | 2,540,059 | 1,597 | 777,128 |
| July | 191 | 100,342 | 123 | 46,747 | 373 | 113,295 | 81 | 27,344 |
| Aug. | — | — | 399 | 165,460 | 451 | 126,962 | 147 | 60,738 |
| Sept. | — | — | 60 | 38,198 | 2,028 | 713,736 | 125 | 56,762 |
| Oct. | — | — | 121 | 59,358 | 429 | 129,065 | 239 | 94,570 |
| Nov. | — | — | 59 | 41,119 | 472 | 140,116 | 88 | 35,409 |
| Dec. | — | — | 83 | 58,811 | 522 | 156,154 | 145 | 59,911 |
| 1929: | | | | | | | | |
| Jan. | — | — | 46 | 30,374 | 484 | 152,260 | 138 | 62,950 |
| Feb. | — | — | 82 | 70,209 | 823 | 255,594 | 40 | 19,806 |
| Mar. | — | — | 90 | 75,444 | 428 | 122,026 | 1 | 1,140 |
| Apr. | 83 | 38,241 | 163 | 93,240 | 1,086 | 315,621 | 1 | 1,086 |
| May | 125 | 57,260 | 70 | 67,891 | 752 | 212,400 | 76 | 24,053 |
| June | 145 | 62,808 | 31 | 26,038 | 802 | 248,143 | 77 | 25,612 |
| July | 200 | 86,175 | 49 | 46,440 | 572 | 180,065 | 14 | 5,807 |

## Reclaimed Rubber in the United States

*(All Quantities in Long Tons—100% Basis)*

| Year | Production | Consumption Tons | Consumption % to Crude | Stocks* | Year | Production | Consumption Tons | Consumption % to Crude | Stocks* |
|---|---|---|---|---|---|---|---|---|---|
| 1919 | 81,366 | 73,535 | 36.3 | ..... | 1924 | 80,079 | 76,072 | 22.4 | ..... |
| 1920 | 86,395 | 75,297 | 38.4 | ..... | 1925 | 132,930 | 137,105 | 35.6 | 13,203 |
| 1921 | 36,725 | 41,351 | 24.1 | ..... | 1926 | 180,582 | 164,500 | 45.9 | 23,218 |
| 1922 | 57,834 | 54,458 | 19.3 | ..... | 1927 | 189,144 | 178,471 | 47.6 | 24,980 |
| 1923 | 74,766 | 69,534 | 22.7 | ..... | 1928 | 208,516 | 223,000 | 50.4 | 24,785 |
| 1927: | | | | | | | | | |
| Jan. | 16,526 | 12,374 | 39.3 | 25,903 | July | 15,488 | 13,842 | 47.4 | 26,599 |
| Feb. | 15,860 | 14,424 | 47.8 | 27,291 | Aug. | 15,109 | 15,836 | 47.3 | 25,157 |
| Mar. | 16,738 | 13,528 | 37.4 | 27,124 | Sept. | 14,392 | 14,790 | 54.3 | 23,429 |
| Apr. | 14,483 | 16,677 | 46.5 | 25,712 | Oct. | 16,127 | 17,292 | 64.5 | 22,176 |
| May | 16,159 | 15,754 | 46.1 | 26,419 | Nov. | 15,477 | 14,876 | 55.5 | 21,728 |
| June | 16,652 | 15,547 | 46.0 | 25,811 | Dec. | 16,088 | 13,431 | 52.7 | 24,980 |
| 1928: | | | | | | | | | |
| Jan. | 14,862 | 20,140 | 58.5 | 21,941 | July | 17,278 | 19,070 | 51.0 | 17,305 |
| Feb. | 15,291 | 18,670 | 55.4 | 20,848 | Aug. | 19,049 | 17,890 | 41.7 | 15,881 |
| Mar. | 17,069 | 20,680 | 57.9 | 19,558 | Sept. | 18,693 | 17,795 | 44.6 | 17,991 |
| Apr. | 15,393 | 19,280 | 58.8 | 19,283 | Oct. | 17,182 | 18,420 | 45.1 | 17,026 |
| May | 18,945 | 20,215 | 54.1 | 18,137 | Nov. | 18,245 | 18,380 | 49.1 | 22,399 |
| June | 18,781 | 18,140 | 48.2 | 18,709 | Dec. | 17,728 | 14,320 | 45.9 | 24,785 |
| 1929: | | | | | | | | | |
| Jan. | 18,685 | 21,068 | 49.1 | 24,394 | July | 18,387 | 20,236 | 48.7 | 19,679 |
| Feb. | 18,094 | 19,829 | 47.7 | 23,305 | Aug. | 19,787 | 18,230 | 47.6 | 22,309 |
| Mar. | 19,984 | 20,867 | 46.7 | 22,076 | Sept. | | | | |
| Apr. | 19,899 | 22,435 | 47.3 | 20,680 | Oct. | | | | |
| May | 20,385 | 23,176 | 47.1 | 19,479 | Nov. | | | | |
| June | 18,416 | 18,141 | 42.0 | 17,980 | Dec. | | | | |

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927 and 9,577 tons in 1928.

# INDEX TO ADVERTISERS

Adamson Machine Co. ..... 654, 691
Akron Equipment Co. ..... 691
Albert & Son, L. ..... 691
Aluminum Flake Co. ..... 689
American Cyanamid Co. ..... 676, 690
Anaconda Zinc Oxide Dept. of I. L. R. Co. ..... 652, 690
Anderson-Prichard Oil Corp. ..... 690

Barrett Co., The ..... 690
Binney & Smith Co. ..... 700, 690
Bridgwater Machine Co. ..... 691

Cabot, Inc., Godfrey L. ..... 657, 689
Cambridge Instrument Co. ..... 654
Carrier Engineering Corp. ..... 691
Carter Bell Manufacturing Co., The ..... 687, 690
Chalfin, Inc., Joseph ..... 692
Cleveland Liner & Mfg. Co. ..... 692
Continental Rubber Co. ..... 692
Cooper, Wm., & Nephews ..... 676, 689

Damascus Manufacturing Corp. ..... 685, 690
Dill Manufacturing Co. ..... 650, 690
Dovan Chemical Corp. ..... 689
du Pont de Nemours & Co., E. I. ..... 648, 689

Emerson Apparatus Co. ..... 691
Erie Foundry Co. ..... 691

Foote Bros. Gear & Machine Co. ..... 691
Farrel-Birmingham Co., Inc. ..... 691
Franz Foundry & Machine Co. ..... 685, 691

General Atlas Chemical Co. ..... 690
General Tire & Rubber Co. ..... 685, 692
Gross, A., & Co. ..... 690

Hall Co., The C. P. ..... 647, 690
Huber, J. M., Inc. ..... 649, 690

India Machine & Rubber Mold Co. ..... 687, 691
International Pulp Co. ..... 682, 689

Lowe Co., The Clyde E. ..... 691

Maywald, Fredk. J. ..... 692
McNulty, Joseph A. ..... 690
Montgomery, W. L., & Co. ..... 687, 690
Moore & Munger ..... 690
Muehlstein & Co., Inc., H. ..... 692

National Aniline & Chemical Co. ..... 689
National-Erie Co. ..... 653, 691
Naugatuck Chemical Co. ..... 658, 689
New Jersey Zinc Co. ..... 690

Olin Laboratories, The R. R. ..... 680, 692

Pequanoc Rubber Co. ..... 692
Philadelphia Rubber Works Co. ..... 684, 692
Plymouth Hotel ..... 674
President Hotel ..... 674
Rand Rubber Co. ..... 687, 692
Rare Metal Products Co. ..... 689
Roessler & Hasslacher Chemical Co. ..... 646, 689
Royle & Sons, John ..... 655, 691
Rubber Regenerating Co. ..... 692
Rubber Service Laboratories Co., The ..... 689

Schrader's Sons, Inc., A. ..... 692
Scott Co., Henry L. ..... 685, 691
Smith and Smith ..... 692
Southwark Mfg. Co. ..... 690
Spadone Machine Co. ..... 691
Stamford Rubber Supply Co. ..... 690
St. Louis Sulphur and Chemical Co. ..... 690

Tasco Asphalt Co. ..... 676, 690
Textile Finishing Machine Co., The ..... 685, 691

United Clay Mines Corp. ..... 689
U. S. Rubber Co. ..... 690
U. S. Rubber Reclaiming Co. ..... 690, 699

Vanderbilt, R. T., & Co. ..... Front Cover, 689

Weber, Hermann ..... 692
West, H. T., Company ..... 690
Whittaker, Clark & Daniels, Inc. ..... 685, 689
Williams, C. K., & Co. ..... 687, 690
Williams Foundry & Machine Co., The ..... 653, 691
Wilson Co., C. T. ..... 692
Wishnick-Tumpeer, Inc. ..... 651, 689

CLASSIFIED ADVERTISING—PAGE 684

## Institution of the Rubber Industry

The various papers dealing with the scientific and technical aspect of rubber manufacture, together with the discussions thereon, read before the Institution of the Rubber Industry, London, England, appear exclusively in the Institution's official journal—the

"I. R. I. TRANSACTIONS"

The Journal is published six times a year, each issue containing approximately 100 pages of papers of vital interest to all interested in the manufacture and cultivation of Rubber, Gutta Percha and Balata.

**Price 4s. 6d. per copy, post free.**
**£1.7.0. for 6 copies, post free.**

Apply for Specimen Copy to W. F. V. Cox
Institution of the Rubber Industry
Faraday House, 10, Charing Cross Road
LONDON, ENGLAND

*In the lead for more than 40 Years*

## GUMMI-ZEITUNG

Trade Journal for the
RUBBER, GUTTA PERCHA, ASBESTOS,
CELLULOID and Allied Industries

Central Organ for the
Whole German Rubber Goods Industry

*Published Every Friday*

SUBSCRIPTION RATES

In United States ..... RM 32
Domestic ..... RM 24

*Sample copy free*

WORLD WIDE CIRCULATION

Main Office of GUMMI-ZEITUNG
Berlin SW 19, Krausenstrasse 35/36

*Best Advertising Results for all those desiring to make trade connections in Germany in this field.*

## THE RUBBER AGE

**(of London)**

THE MONTHLY PUBLICATION
for
ALL BRANCHES OF THE RUBBER INDUSTRY

*Circulates Among Raw Rubber Producers,*
*Importers, Manufacturers*
*and Dealers*

Published on
1st of each month

Subscription 10/- per annum
Single copies 1/3d post free

OFFICES:—43 ESSEX STREET, STRAND, LONDON, W.C.2.

ge
29